

Rhodora

JOURNAL OF THE
NEW ENGLAND BOTANICAL CLUB

Conducted and published for the Club, by

REED CLARK ROLLINS, Editor-in-Chief

ALBERT FREDERICK HILL
STUART KIMBALL HARRIS
RALPH CARLETON BEAN
RICHARD ALDEN HOWARD
CARROLL EMORY WOOD, JR.

} Associate Editors

Vol. 58

October, 1956

No. 694

CONTENTS:

The Identity of <i>Calyplocarpus blepharolepis</i> . S. F. Blake.....	275
Range Extensions in Northwestern Plants. F. J. Hermann.....	278
Nuttall Not the Author of Fraser's Catalogue. Lloyd H. Shinnars	281
Some Additions to the Orchid Flora of Puerto Rico. Harold F. Winters and Charles Schweinfurth.....	290
Growth Habits of <i>Arabis perstellata</i> . E. Lucy Braun.....	292
A Cytotaxonomic Study of the Genus <i>Hymenopappus</i> (Compo- sitae). Billie L. Turner (concluded).....	295
Notes on <i>Collinsia violacea</i> . Glen S. Winterringer.....	308
<i>Tiarella cordifolia</i> in Wisconsin. Paul F. Maycock.....	309
<i>Medicago polymorpha</i> var. <i>vulgaris</i> . Lloyd H. Shinnars.....	310

The New England Botanical Club, Inc.

8 and 10 West King St., Lancaster, Pa.

Botanical Museum, Oxford St., Cambridge 38, Mass.

RHODORA.—A monthly journal of botany, devoted primarily to the flora of the Gray's Manual Range and regions floristically related. Price, \$6.00 per year, net, postpaid, in funds payable at par in United States currency in Boston; single copies (if available) of not more than 24 pages and with 1 plate, 60 cents, numbers of more than 24 pages or with more than 1 plate mostly at higher prices (see 3rd cover-page). Back volumes can be supplied at \$5.00. Some single numbers from these volumes can be supplied only at advanced prices (see 3rd cover-page). Somewhat reduced rates for complete sets can be obtained on application to Dr. Hill. Notes and short scientific papers, relating directly or indirectly to the plants of North America, will be considered for publication to the extent that the limited space of the journal permits. Illustrations can be used only if the cost of engraver's blocks is met through the author or his institution. Forms may be closed five weeks in advance of publication. Extracted reprints, if ordered in advance, will be furnished at cost.

Address manuscripts and proofs to Reed C. Rollins,
Gray Herbarium, 22 Divinity Ave., Cambridge 38, Mass.

Subscriptions (making *all remittances* payable to RHODORA) to Dr. A. F. Hill, 8 W. King St., Lancaster, Pa., or, preferably, Botanical Museum, Oxford St., Cambridge 38, Mass.

Entered as second-class matter March 9, 1929, at the post office at Lancaster, Pa., under the Act of March 3, 1879.

INTELLIGENCER PRINTING COMPANY
Specialists in Scientific and Technical Publications
EIGHT WEST KING ST., LANCASTER, PA.

**CARD-INDEX OF NEW GENERA, SPECIES AND
VARIETIES OF AMERICAN PLANTS**

For all students of American Plants the Gray Herbarium Card-index of Botanical Names is indispensable. It is a work of reference essential to scientific libraries and academies and all centers of botanical activity. It includes genera and species from 1885 to date. The subdivisions of species from 1885 to date are now included and from 1753 to 1886 are in the process of being inserted. Issued quarterly, at \$25.50 per thousand cards.

GRAY HERBARIUM of Harvard University,
Cambridge 38, Mass., U. S. A.

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 58

October, 1956

No. 694

THE IDENTITY OF CALYPTOCARPUS BLEPHAROLEPIS

S. F. BLAKE

THE type sheet of *Calyptocarpus blepharolepis* Robinson (Proc. Amer. Acad. 47 (Contr. Gray Herb. 39): 214. 1911) in the Gray Herbarium bears a printed label indicating that the material had been collected by *S. M. Tracy* (no. 8946) at Tensaw, Alabama, August 18, 1904, and identified as *Calyptocarpus*¹ *tampicanus* Small [= *Calyptocarpus vialis* Less.] by E. L. Greene. Both specimens on the type sheet are characteristic *Sanvitalia ocymoides* DC., matching very well a number of collections in the Gray Herbarium, including *Berlandier 2102* (type collection of *S. ocymoides*), *Berlandier 2233* (type collection of *S. tragiaefolia* DC., a synonym of *S. ocymoides*), *Pringle 1918*, and others. In the same herbarium is a sheet of true *Calyptocarpus vialis* Less. with printed label stating that it had been collected by *Tracy* (no. 8942) at Corpus Christi, Texas, April 4, 1905, and determined by Greene as *Sanvitalia ocymoides* DC.

The specimen of *Tracy 8942* in the British Museum of Natural History, which I examined many years ago, agrees with that in the Gray Herbarium, and the specimen in the U. S. National Herbarium is like the others. The label of the sheet of no. 8946 in the latter herbarium, however, has only the heading printed, the remainder being in ink. It is labeled in Greene's hand *Calyptocarpus tampicanus* Small; the number 8946 and the data—Brownsville, Texas, April 13, 1905—are in another handwriting, which Mrs. Agnes Chase identifies as that of S. M. Tracy

¹ Lessing's name *Calyptocarpus* has been persistently but improperly emended by authors to *Calyptocarpus*.

himself. The plant itself is *Sanvitalia ocymoides*, like all the other specimens of 8946 examined.

This specimen (8946) is sheet no. 1,240,727 in the U. S. National Herbarium, in a quite different group of numbers from the sheet of Tracy 8942 with the printed label, which is no. 513729. The latter is one in a broken series of nearly 300 numbers received from Tracy himself (between no. 7642 and no. 9618). The sheet of 8946 falls in a much smaller lot including about 70 specimens, which has no accession number, so that its source is not definitely recorded. The lot consists largely of Canadian plants (mostly Compositae) collected by Macoun and Spreadborough, but includes among others 9 Tracy specimens, all numbered in the 8900's. Of 7 of these that I have been able to trace in the herbarium, all 6 besides the *Calyplocarpus* have a mostly handwritten label like that of the *Calyplocarpus* (data in Tracy's hand, name in Greene's). One of them, labeled *Carphephorus corymbosus* in Greene's hand, is actually *Polypteris integrifolia* Nutt., and a duplicate with completely printed label, belonging in the lot of nearly 300 numbers referred to above, bears the same data. In this case, there is no reciprocal specimen of *Carphephorus* labeled as *Polypteris* in the herbarium and it would appear that Greene, in a moment of mental aberration, had actually made this misidentification. It seems reasonably certain that this lot of about 70 specimens was received from Greene himself, perhaps at different times, since there is no lot number.

From all this it would appear that Greene had actually identified no. 8946 as *Calyplocarpus*, although it is *Sanvitalia*. Such a misidentification, although unlikely, is possible, but it seems most improbable that Greene would have misidentified the other component of the pair in a precisely reciprocal way. If a transposition somehow occurred, it seems impossible to determine from the available evidence whether the locality was switched as well. Mrs. Chase tells me that when she looked through the grasses of Tracy's herbarium in 1907, at his invitation, she found the arrangement of the material far from orderly, so that it would be easy to believe that an earlier transposition of numbers or labels might have occurred there. Whatever the truth of this matter, the fact that evidently both 8942 and 8946 were

collected in Texas makes it possible to discard the locality Tensaw, Alabama, attributed to the type of *C. blepharolepis* on its printed label and in the original description. Whether it actually came from Brownsville or from Corpus Christi is uncertain.

Dr. Albert L. Delisle informs me that there is no material of either *Calyptocarpus* or *Sanvitalia* in the E. L. Greene Herbarium at Notre Dame University, and Dr. F. W. Gould writes that the Tracy Herbarium preserved at the Texas A. & M. College at College Station, Texas, does not have a specimen of either of the two Tracy exsiccatae in question.

Aside from the evidence supplied by the Texas locality on the handwritten label of no. 8946, it is extremely unlikely that either *Sanvitalia oeymoides* or *Calyptocarpus vialis* could have been found in Alabama in 1904. So far as the *Sanvitalia* is concerned, there are at the present time no specimens from east of Texas in the herbaria at Washington, Beltsville, Cambridge, and New York, and I know of no records for it. *Calyptocarpus vialis*, although now known from Texas to Florida, and south into Mexico, does not appear to have begun its eastward march so early. Small (Flora, ed. 1, 1903 and ed. 2, 1913) gave it only from southern Texas, and it is not listed in Mohr's Plant Life of Alabama (1901), in Lowe's Plants of Mississippi (1921), or in any of the local floras of these states and of Louisiana and Florida listed in part 1 of the Geographical Guide to Floras of the World (1942). It is represented in the U. S. National Herbarium from the states east of Texas only by a sheet from New Orleans, La., collected by H. R. Reed in 1927. I collected it myself in waste ground in Audubon State Park in that city in the spring of 1955. In the herbarium of the U. S. National Arboretum are specimens collected by O. M. Freeman in lawns at Miami, Florida, in Jan. 1940 and again in Feb. 1948. In the herbarium of the New York Botanical Garden (data supplied by R. C. Cowan) are specimens from LOUISIANA: Waste lots, New Orleans, 1930, *Small and Alexander*. ALABAMA: Campus of the University, on damp, shaded, wooded hillside, Tuscaloosa, 1951, *Bert C. Williams*. FLORIDA: On edge of lawn, growing in dense mat for about 100 feet, Coral Gables, 11 Jan. 1946, *W. M. Buswell*.

To summarize: It is evident that Dr. Robinson, observing that the material distributed as "*Calypocarpus tampicanus*" under Tracy's no. 8946 was not that species, proceeded to describe it as new without sufficiently checking the generic characters. It is also quite evident that the specimens of *Sanvitalia ocyroides* on which the new specific name was based were collected in Texas, not in Alabama, but it is not certain whether they came from Brownsville or Corpus Christi. The name *Calypocarpus blepharolepis* Robinson becomes a synonym of *Sanvitalia ocyroides* DC., and the genus *Calypocarpus* remains monotypic.—
PLANT INDUSTRY STATION, BELTSVILLE, MD.

RANGE EXTENSIONS IN NORTHWESTERN PLANTS

F. J. HERMANN

DURING the late summer of 1955 Bernard M. Leese and the writer were detailed by the Plant Introduction Section, Horticultural Research Branch, U. S. Department of Agriculture to collect seed of native plants in northwestern United States for forage experimentation. A number of the plants collected represent appreciable extensions in range, new state records, etc., which seem to be worth recording. Collection numbers cited in the list are those of the writer. Herbarium abbreviations, taken from Lanjouw's Index Herbariorum (Regnum Vegetabile Vol. 2, Part 1, 1954), are as follows: CA—California Academy of Sciences, San Francisco; Mont—Montana State College, Bozeman; NA—National Arboretum Herbarium, Washington, D. C.; RM—Rocky Mountain Herbarium, Laramie, Wyo.; and US—National Herbarium, Washington, D. C.

PLANTS NEW TO MONTANA

MUHLENBERGIA GLOMERATA (Willd.) Trin. *Salix-Potentilla* bog, 2 miles NE. of Upper Red Rock Lake, Beaverhead Co., Sept. 10 (12491, Mont, U. S.).

CAREX LEPTOPODA Mack. Springy roadside embankment bordering Thuja woods E. of Lake McDonald, Glacier National Park, Flathead Co., Sept. 4 (12440, Mont, NA); boggy edge of streamlet, clearing in larch-hemlock woods, SW. of Hungry Horse Dam, ca. 5 miles SE. of Hungry Horse, Flathead Co., Sept. 6 (12466, Mont.). Reported from Glacier National Park by Standley but not recorded from the state by Mackenzie.

JUNCUS COMPRESSUS Jacq. Marshy roadside ditch, 9 miles S. of Wisdom, Beaverhead Co., Sept. 9 (12484 CA, Mont, NA, US). Apparently not previously reported west of eastern Ontario.

Additions to the Flora of Glacier National Park

The following species are not recorded in Standley's Flora (Contrib. U. S. Nat. Herb. 22: 235-438. 1921) or in the supplementary reports by Graff (Bull. Torr. Bot. Club 49: 175-181. 1922), Maguire (Rhodora 36: 305-308. 1934 and 41: 504-508. 1939), McLaughlin (Rhodora 37: 362-365. 1935) and Harvey (Proc. Mont. Acad. Sci. 14: 23-25. 1954).

ELYMUS INNOVATUS Beal. Moist open bank of Belly River, 3 miles S. of Canadian border, Glacier Co., Sept. 3 (12432, Mont, US).

CAREX CUSICKII Mack. Marshy border of pond, end of old logging road No. 20, alt. ca. 3500 ft., Flathead Co., Sept. 5 (12445, Mont, NA; 12447, US).

CAREX MICROPTERA Mack. Low moist edge of log trail through spruce-fir woods, alt. ca. 4900 ft., Piegan Pass Trail ca. ½ mile N. of Gunsight Lake Trail, Glacier Co., Sept. 2 (12413, Mont, NA).

CAREX PHYSOCARPA Presl. Marshy clearing in willow thicket, W. shore of Swiftcurrent Lake, alt. 4860 ft., Glacier Co., Aug. 30 (12368, Mont, NA). Standley's report of *C. miliaris* Michx. is probably referable to this species.

CAREX STIPATA Muhl. Springy roadside embankment bordering Thuja woods E. of Lake McDonald, Flathead Co., Sept. 4 (12439, Mont, NA); edge of Lime Springs Beaver Pond, alt. 3500 ft., S. of Apgar Mts., Flathead Co., Sept. 4 (12443, Mont, US).

PLANTS NEW TO WYOMING

CAREX HETERONEURA W. Boott. Wet mossy border of streamlet in narrow ravine, alt. 8700 ft., W. slope of Mt. Washburne, ca. ½ mile N. of Dunraven Pass, Yellowstone National Park, Sept. 12 (12535, NA; 12536 CA, Mont, RM, US). Previously known only from California and western Nevada.

CAREX LEPORINELLA Mack. Dried bed of draw in meadow, Continental Divide, alt. 8300 ft., 4 miles NW. of West Thumb, Yellowstone National Park, Sept. 12 (12519, CA, Mont, NA, RM). Recorded only from the Pacific States by Mackenzie; recently reported (Arner. Midl. Nat. 51: 272. 1954) also from Nevada.

CAREX LIMNOPHILA F. J. Hermann (Leaf. West. Bot. 8: 28 1956). Gravelly edge of road bordering willows on north shore of Half Moon Lake, alt. ca. 7500 ft., Wind River Range, 7 miles NE. of Pinedale, Sublette County, Aug. 21 (12252, CA, NA, RM, US); abrupt mossy shore of Bridge Bay, Yellowstone Lake, alt. ca. 7800 ft., 3 miles SW. of Lake Junction, Yellowstone National Park, Sept. 12 (12527, Mont, NA, US). Endemic to Wyoming so far as known.

CAREX PRAECEPTORUM Mack. Willow fringe of Little Bear Creek, alt. ca. 9000 ft., in meadow 2½ miles ENE. of Beartooth Lake, Park

Co., Sept. 13 (12552, Mont, NA, RM). Known to Mackenzie only from the Pacific States; recently reported (Amer. Midl. Nat. 51: 274. 1954) also from Nevada.

CAREX STENOPTILA F. J. Hermann (Leaf. West. Bot. 4: 194. 1945). Rocky bank of Isa Lake, Craig Pass, alt. 8300 ft. (12512, CA, Mont, NA, RM) and dry open lodgepole pine-fir woods, alt. 8700 ft., W. slope of Mt. Washburne ca. ½ mile N. of Dunraven Pass, Yellowstone National Park, Sept. 12 (12537, CA, NA, US). Previously known only from Colorado.

CAREX SUBTRICTA (Kükenth.) Mack. Sedge meadow, Fiddler's Lake, Wind River Range, alt. ca. 10,000 ft., 24 miles SW. of Lander, Fremont Co., Aug. 23 (12280, NA).

JUNCUS BIGLUMIS L. Edge of cold streamlet on tundra below Beartooth Pass, alt. 10,500 ft., Park Co., Sept. 13 (12562, CA, Mont, NA, RM, US). Although Rydberg (Flora of the Rocky Mountains and Adjacent Plains, p. 152. 1922) indicates the range of this arctic-alpine species as "Greenl.—B.C.—Alaska; Eurasia," Buchenau (in Engler, Das Pflanzenreich 4 (36): 223. 1906) cites a collection of Theodore Holm's from Long's Peak, Colorado, and Standley (Contrib. U. S. Nat. Herb. 22: 307. 1921) reports the plant from Gunsight Pass, Glacier National Park, Mont.

JUNCUS TRACYI Rydb. Dominant on wet open springy slope, edge of Douglas fir-aspen woods, alt. ca. 7000 ft., 5.6 miles W. of Tower Junction, Yellowstone National Park, Sept. 13 (12541, CA, Mont, NA, RM, US).

JUNCUS VASEYI Engelm. Damp crevices on rock shore, head of Half Moon Lake, alt. ca. 7500 ft., Wind River Range, 8 miles NE. of Pinedale, Sublette Co., Aug. 21 (12262, NA).

Additions to the Flora of Yellowstone National Park

McDougall and Baggley's "Plants of Yellowstone National Park" (U. S. Govt. Printing Office, Washington, 1936) does not include the following plants.

CAREX HETERONEURA W. Boott. (Data under Wyoming.)

CAREX ILLOTA Bailey. Boggy edge of Isa Lake, Craig Pass, alt. 8300 ft., Sept. 12 (12509 NA, RM); meadow, Continental Divide, alt. 8300 ft., 4 miles NW. of West Thumb, Sept. 12 (12522, US).

CAREX KELLOGGII W. Boott. Rocky bank of Isa Lake, Craig Pass, alt. 8300 ft., Sept. 12 (12511, NA, RM).

CAREX LEPORINELLA Mack. (Data under Wyoming.)

CAREX LIMNOPHILA F. J. Hermann. (Data under Wyoming.)

CAREX MICROPTERA Mack. Rocky bank of Isa Lake, Craig Pass, alt. 8300 ft., Sept. 12 (12510, NA, RM, US).

CAREX NEUROPHORA Mack. Wet mossy border of streamlet in narrow ravine, alt. 8700 ft., west slope of Mt. Washburne, ca. ½ mile N. of Dunraven Pass, Sept. 12 (12534, NA, RM, US).

CAREX STENOPTILA F. J. Hermann. (Data under Wyoming.)

CAREX TOLMIEI Boott. Meadow, Continental Divide, alt. 8300 ft., 4 miles NW. of West Thumb, Sept. 12 (12521, NA, RM).

JUNCUS HALLII Engelm. Plentiful in meadow, Continental Divide, alt. 8300 ft., 4 miles NW. of West Thumb, Sept. 12 (12520, NA, RM, US).

JUNCUS TRACYI Rydb. (Data under Wyoming.)

LUZULA PIPERI (Coville) Jones. Abrupt mossy shore of Bridge Bay, Yellowstone Lake, alt. ca. 7800 ft., 3 miles SW. of Lake Junction, Sept. 12 (12528, NA).

ASTER LEUCANTHEMIFOLIUS Greene. Open rhyolite slope on Norris Basin-Mammoth Hot Springs Road, alt. ca. 7800 ft., Sept. 11 (12502, NA).

PLANT NEW TO UTAH

THERMOPSIS RHOMBIFOLIA Nutt. Open lodgepole pine forest W. of Sheep Creek Canal, alt. ca. 8500 ft., Uinta Mts., Aug. 14 (12129, NA, US).

Additions to the Flora of the Uinta Mountains

Two species not reported in Graham's "Botanical Studies in the Uinta Basin of Utah and Colorado" (Annals Carnegie Mus. (Pittsburgh) vol. 26. 1937) are the following.

AGROPYRON LATIGLUME (Scribn. & Sm.) Rydb. Meadow along Middle Fork of Sheep Creek, atl. 9000 ft., on road to Spirit Lake, Aug. 14 (12136, US).

THERMOPSIS RHOMBIFOLIA Nutt. (Data under Utah.)

NEVADA RANGE EXTENSION

The occurrence of *Trifolium monanthum* A. Gray in eastern Nevada, while not a new record for the State, is a rather notable extension in range since the species has previously been known only in western Nevada. This was collected on the moist bank of a stream in aspen woods, Lamoille Canyon, alt. ca. 7800 ft., Ruby Mts., 7 miles SE. of Lamoille, Elko Co., Aug. 10 (12087, NA)—PLANT INDUSTRY STATION, BELTSVILLE, MD.

NUTTALL NOT THE AUTHOR OF FRASER'S CATALOGUE

LLOYD H. SHINNERS

NUTTALL in 1818 unequivocally acknowledged only 13 out of 71 new names in Fraser's 1813 Catalogue as his. Ten of the 13 had appeared as *nomina nuda*. Two were placed in synonymy, and two were misquoted (including one of those placed in synonymy). In addition he published as new 10 species listed in the Catalogue without mention of the fact that they had appeared there. He obliquely claimed responsibility for another which he does not cite by name, and for which he adopts Pursh's binomial, though pointing out that Pursh had described a mixture representing two genera (*Astragalus crassicaupus*, called by Nuttall *A. carnosus* Pursh, the discordant element being named *Sophora sericea*

Nuttall). In 1840 (Trans. Amer. Philos. Soc. 7: 301, in comments under *Dieteria sessilifolia*) he directly claimed responsibility for one or presumably two more ("*Aplopappus spinulosus*, to which I applied the name of *Sideranthus* in Fraser's Catalogue": two species are there listed under this generic name). Two names which had appeared in the Catalogue were credited by Nuttall in 1818 to the Botanical Magazine (*Bartonia decapetala*, there credited to Pursh) and its editor, Sims (*Allium stellatum*, there credited to Ker-Gawler), and a third (*Oenothera macrocarpa*) was credited to Pursh. The implication is that the Catalogue (with 89 names altogether) was prepared by someone who used a small number of Nuttall's names and in addition a much larger number of names coined by other persons. This seemed so obvious that the point was not elaborated in my previous article. It was surprising to read Dr. Graustein's statement that "there is no doubt" that Nuttall authored the Catalogue, and that I had furnished "no convincing evidence" to the contrary. The assertion of Cronquist, Keck and Maguire that "it is universally acknowledged that many or all of the new names contained in it were those of Thomas Nuttall" is untrue, and is an attempt to present hearsay as if it were scientific evidence.

Under English and American common law, a man is judged innocent until proved guilty. The ready assumption that Nuttall authored Fraser's Catalogue is therefore legally unsound. I must protest being put on the defensive when in reality it is the opposition who must prove their case. Instead of uncritically adopting a plausible supposition, we should assemble evidence about it. By a detailed comparison of the Catalogue and the works of Nuttall and Pursh, I obtained what seemed to me adequate evidence for rejecting the thesis that Nuttall wrote the Catalogue. It did not seem adequate to others, and for that reason I am going to the unwelcome trouble of presenting further arguments.

Let me insist again that this is really uncalled for. As a matter of basic law, my side of the case requires no argument until seriously challenged. The burden of first proof rests with the opposition. Let me begin by playing Devil's advocate and summarizing their evidence, since they have not made any effort

to do so. First is the fact that Nuttall wrote "by T. Nuttall" on the Philadelphia copy of the Catalogue. This I have already stated does not have to mean that he claimed to be its author, but can mean instead merely that he claimed to have brought back the plants listed in it, which he unquestionably had. The philosophical Doctrine of Parsimony asks that in propounding a theory, we adopt one that requires the least possible amount of assumption. Stated more pithily, that theory is best which theorizes least. It better accords with this doctrine to uphold the second interpretation, which asks us to assume nothing that is not already known to be true, than it does to uphold the first one, which is wholly supposititious. Further, Nuttall's own later actions are strangely inconsistent with the first interpretation, but not at all with the other. I hold therefore that the first piece of evidence to support the claim of Nuttallian authorship has not proved it. The second piece of evidence is the fact that Nuttall in later publications (chiefly in his *Genera*, 1818; one item in 1840, mentioned above) claimed responsibility for certain names in the Catalogue. I have already pointed out that he claimed remarkably few of them, and that he specifically credited three of them to other authors. If he was the direct author of the catalogue, why did he ignore most of the names in it, and why did he credit some to persons other than himself? Again I choose the explanation that demands least in the way of gratuitous assumption: that the Catalogue was prepared by someone else who adopted a rather small number of names coined by Nuttall, along with many more which were not. Again, the thesis of Nuttallian authorship is not proved. And let me repeat that what we must first require is that it be proved, not that it be disproved.

Let me extend my role of Devil's advocate by indulging in further suppositions like that of Nuttallian authorship for the Catalogue, but in another direction. I suggest that the 10 names which Nuttall published in 1818 as new, without mentioning that they had appeared in the Catalogue, had not originated with him at all, but were the inventions of someone else; that Nuttall was expropriating them in exactly the same free manner that Sims, Ker-Gawler and Pursh had done before him. Such was the practise of the time! There has been too

much repetition of the theme that Pursh was an exceptional blackguard. Let us see how his contemporaries behaved.

John Sims described *Oenothera missouriensis* with Plate 1592 of Curtis's Botanical Magazine, dated Nov. 1, 1813. Sims states that it was "found by Mr. Nuttall in the neighbourhood of the Missouri," and adds, "We do not find that this species has been before noticed: it seems to differ from every one described by MICHAUX or by PURSH, whose valuable Flora, speedily to be published, we have been favoured with the opportunity of consulting. . . . Communicated from the Sloane-Square Nursery by Messrs. J. and J. T. FRASER." It was not relayed to Pursh for him to publish in his Flora! In Fraser's Catalogue it appears as *O. macrocarpa* (which name must be adopted if the Catalogue names are considered valid). It was described as new by Pursh under the same name, and by Nuttall in 1818 as his new species *O. alata*, with "*O. macrocarpa* PH." as synonym, but no mention of *O. missouriensis*. In view of Nuttall's several references to the "Bot. Mag.," his disregard of Sims's binomial is very odd, and possibly not wholly "innocent," to borrow from Dr. Graustein's quotation. And how are we to regard his bald rejection of both the original Catalogue name and that of Pursh? John Bellenden Ker, or Ker-Gawler as he styled himself (identified only by the cryptic initial "G."), described *Scilla esculenta* with Plate 1574 of the Botanical Magazine, dated Aug. 1, 1813, citing as synonyms *Phalangium esculentum* "Fraser's Catalogue, &c.," and *Phalangium Quamash* Pursh, "*nondum evulgata*." He says, "We have added the synonym from the work of Mr. PURSH, in consequence of a communication that gentleman was so obliging as to make to us, in which he assured us, that Mr. FRASER's plant, from which our drawing has been made, was of the same species as that he had in view. . . . We have not had the opportunity of seeing the figure in Mr. PURSH's work, which is not yet published. . . . Our drawing was made from a plant imported by Mr. NUTTALL, which flowered at Mr. FRASER's Nursery, in Sloane-Square."

Instead of belaboring Pursh so persistently for his treatment of Nuttall, should we not extend our sympathies for the treatment he received from Sims and Ker-Gawler? Perhaps not. They were birds of a feather, and on at least one notorious

occasion joined forces in a deed now regarded as nefarious, but taken more casually then. In publishing *Bartonia decapetala* (Bot. Mag. t. 1487, Aug. 1, 1812), Sims declares, "Living plants have been brought to this country, by Mr. THOMAS NUTTALL, who collected them. . . . It has not however as yet flowered here, on which account our drawing was taken from dried specimens. It is by particular request only that we have been induced to publish such, contrary to our rule, seldome deviated from, and never without mentioning it, of admitting none but drawings from the life. . . . For the above generic and specific characters, and indeed for the whole communication, we are indebted to Mr. FREDERICK PURSH, author of a new Flora of North-American plants, now in the press." Considering the very free and easy practices of the time, it does not seem to me at all unreasonable to think that Nuttall in 1818 sometimes indulged in the same kind of thing. I think it plausible to explain the 10 names lifted from Fraser's Catalogue without acknowledgment as evidence that he did. True, I have no proof of it. But it is just as true that there is no real proof of the contrary.

A point in the above examples calling for particular emphasis is the fact that none of the authors accepted Fraser's Catalogue names as having legal status. Pursh and Nuttall both quote them, sometimes adopting and publishing them as new. Sims and Ker-Gawler regularly quote as inconsequential synonyms names from "Fraser's Catalogue, &c." when describing new species. What is meant by the unexplained abbreviation "&c."? Could there have been other, less renowned nursery lists in which names appeared? Could one or more such have come out ahead of Fraser's? For the benefit of the opposition, I declare that both suppositions are true, and that we must search for still older and unknown authors of the names, and perhaps for additional descriptions for many which were *nomina nuda* in the one catalogue which has come down to us. Fantasy, yes, but surely plausible. In accordance with the practise of the opposition, my thesis is therefore valid, and must be accepted until someone can absolutely disprove it.

Dr. Graustein's assertion that Nuttall did not consider the Catalogue names validly published should dispose of the matter for those who believe that he wrote it. But Cronquist, Keck

and Maguire have put forth an astonishingly incoherent argument for validity of "Nuttall's" names containing the statement that authorship is irrelevant. Their assertion that the names "were accepted in that published work by whoever wrote it" is dogmatic and quite meaningless. As pointed out above, none of the four known botanical authors involved (at least three of whom reportedly coined names used in the Catalogue) accepted those names as legally published. We must look at the case with our present rules of nomenclature in mind. Despite the seemingly scandalous customs of the time, our four early botanists behaved in this case remarkably in keeping with our current views on valid publication and formal acceptance by an author of new names. I see no justification for acting contrary to both early custom and modern rules. It is really supererogation to bring in anonymity as equivalent to non-acceptance in order finally to reject the Catalogue names, but I repeat that this is logical and legitimate. The three contending authors have presented no reason to refuse Rousseau's suggestion. They state flatly in one sentence that "anonymity of the author is no bar, under the Rules, to validity of publication of a name," but add lamely in the same paragraph that they "do not wish to comment on the status" of Rousseau's example, and follow this with the dogmatic statement about the Catalogue (wholly unproved, and refuted by contemporary evidence) which has just been quoted.

Still we have not done with this much belabored subject. If so much in it is controversial, we may well turn to established usage, to glean any help we can. Let us review in detail the names which appeared in Fraser's 1813 Catalogue with enough description to require consideration. Of the twenty, three were validly described by Nuttall in 1818 with the same binomials, were not named by anyone else in the interim, and therefore need not concern us further: *Cactus* (now *Mammillaria*) *viviparus*, *Lilium andinum*, *Rudbeckia purpurea* var. *serotina*. A fourth had an older name: *Vitis campestris* was *V. riparia* Michx. (*V. vulpina* of authors). The two species of *Sideranthus* may be disregarded, since they were given a combined description and were not differentiated. (The generic name may also be rejected as an inextricable mixture, though as Britten pointed out, it should have been adopted under the American Code for

Chrysopsis because the first species to be listed when the two were differentiated was in the later-described genus: a case for so doing could even be made out now, if my transfer of *Chrysopsis* to the older *Heterotheca* is no more acceptable than my views on Fraser's Catalogue.) For three species, the only question is one of authorship: *Eriogonum flavum* (published by Pursh, not claimed by Nuttall), *Malva* (now *Sphaeralcea*) *coccinea* (published by Pursh, later claimed by Nuttall), and *Phalangium* (now *Camassia*) *esculentum* (described by Ker-Gawler as *Scilla esculenta*, next by Pursh as *Phalangium Quamash*, then claimed by Nuttall with the original Catalogue name). For the last-named species, Gould unaccountably uses the binomial *Camassia Quamash* (Pursh) Greene in his revision of the genus (Amer. Midl. Nat. 28: 728, 1942). This must give way to *C. esculenta*, with (Nutt.) Lindley as authorities if dated from the Catalogue (very precisely with "J. & J. T. Fraser" in parentheses, as publishing authors), or (Ker-Gawler) Lindley if dated from the Botanical Magazine.

If we reject the Catalogue names, we must abandon *Amorpha nana* Nutt., *Astragalus crassicaupus* Anon. (Nutt.?—he does not actually admit responsibility for this binomial, though obliquely claiming the species was his), *Dalea enneandra* Anon., *Agastache anethiodora* (Anon.) Britton, *Penstemon grandiflorus* Anon., *Ratibida columnifera* (Anon.) Wooton & Standley, and *Yucca glauca* Anon. (Names which were never acknowledged by Nuttall as his are marked "Anon."; they would have to be credited to J. & J. T. Fraser if to anyone.) These would have to be called respectively *Amorpha microphylla* Pursh, *Astragalus carnosus* Pursh emend. Nutt., *Dalea laxiflora* Pursh, *Agastache Foeniculum* (Pursh) Kuntze, *Penstemon Bradburii* Pursh, *Ratibida columnaris* (Pursh) Rafinesque, and *Yucca angustifolia* Pursh. It should be pointed out again that Nuttall himself accepted the second, third, fifth, and sixth of the latter names, in contemporary combinations; that he credited *Penstemon grandiflorus* to "Fras. Cat." and not to himself; that he never mentioned *Hyssopus* (later *Agastache*) *anethiodorus*; and that he claimed only *Amorpha nana* as his.

If we accept the Catalogue names as validly published, we must abandon *Oenothera missouriensis* Sims, *O. caespitosa* Sims,

Grindelia squarrosa (Pursh) Dunal, and *Gaillardia aristata* Pursh. These must be called respectively *Oenothera macrocarpa* Nutt. (or J. & J. T. Fraser), *O. cespitosa* Nutt. (or J. & J. T. Fraser), *Grindelia* (new combination based on *Thuraria herbacea* Anon. in J. & J. T. Fraser), and *Gaillardia* (new combination based on *Virgilia grandiflora* Anon. in J. & J. T. Fraser). Under present extremist rules, since publishing authors are held more important, we need cite only the names of the Frasers if we choose, crediting none to either Nuttall or Pursh.

In mentioning only the case of *Penstemon grandiflorus* vs. *P. Bradburii* ("bradburyi"), the three New York authors were telling us a great deal less than the whole truth. If their views are accepted, we shall be required to replace three very familiar names of widespread and economically important species (*Oenothera missouriensis*, cultivated; *Grindelia squarrosa*, weed; *Gaillardia aristata*, cultivated) with much more offensive substitutes than *Penstemon Bradburii*, two of them new combinations! How much better to take the course which requires no new names, and the displacement of none that are nearly so common and widely known as the three just cited. (I discount *Astragalus carnosus* and *Dalea laxiflora* because each of these species appears in current works not under one name but under three. No possible course of action can avoid the rejection of names for them which have become well known for some parts of the country.) The three authors claim to "believe that the interests of nomenclatural stability would be better served by the admission of Fraser's Catalogue as a proper publication than by its rejection." I ought to have been utterly crushed by the weight of so much eminent authority. Instead I survive to observe mildly that authority is, after all, an imprecise term.

My earlier conclusions still stand. There is no proof that Nuttall himself wrote Fraser's Catalogue. This was compiled by a person or persons unknown, using some unpublished names coined by Nuttall (possibly even with his assistance in so doing), but using a much larger number of names originated by others. The Catalogue names were not accepted as validly published in it by Nuttall, nor by Pursh, nor by Sims, nor by Ker-Gawler. There is no necessity to accept them today. By rejecting them, we keep name changes to a minimum.

A last additional note on *Astragalus carnosus*. It is known that Pursh himself was describing primarily a specimen of *Sophora sericea*. He added the fruit characters from an *Astragalus* collected by Nuttall, and chose an epithet describing the fruit in particular. The binomial therefore rests on discordant syntypes, regardless of the fact that Pursh may not have had in his hands material of anything but the *Sophora*. Under the rules, the first author to select a lectotype for a species based on a mixture fixes the application of the binomial. This Nuttall did in 1818, by restricting the binomial to the *Astragalus* element. If we reject the Catalogue name (as Nuttall himself did, and as I argue we therefore must do), and do not split up the genus *Astragalus*, the plant must be *Astragalus carnosus* and cannot legally be called anything else. Pursh's primary type material ceased to have any bearing on the application of the binomial when Nuttall explicitly defined it as belonging to an *Astragalus*.

PERTINENT LITERATURE

- BRITTEN, JAMES. 1899. Bibliographical notes. XXI.—Fraser's Catalogues. Journ. Bot. 37: 481-487. (The author insists on "Fraser's Catalogues" instead of "Fraser's Catalogues," but the two younger Frasers and their contemporaries invariably used the latter form, which is retained in my articles.)
- CRONQUIST, ARTHUR, DAVID D. KECK AND BASSETT MAGUIRE. 1956. Validity of Nuttall's names in Fraser's Catalogue. RHODORA 58: 23-24.
- GRAUSTEIN, JEANNETTE E. 1956. Nuttall's quarrel with Pursh. RHODORA 58: 20-22.
- GREENE, EDWARD L. 1890. Reprint of Fraser's Catalogue. Pittonia 2: 114-119.
- HOOKE, W. J. 1837. Biographical sketch of John Fraser, the botanical collector. Comp. Bot. Mag. 2: 300-305. (Includes a list of "North American plants, discovered and introduced by John Fraser, between 1785 and 1799; and by J. Fraser, Jun., from 1799 to 1817." For 74 species, reference is made to published plates, mostly in the Botanical Magazine, some in the Botanical Register, Hooker's Exotic Flora, and Loddiges' Botanical Cabinet. None is cited after *Oenothera missouriensis*, Sims's plate of this being listed a line above after *O. macrocarpa*, perhaps from a clerical or typographical error.)
- NUTTALL, THOMAS. 1818. The Genera of North American Plants. 2 vols.
- PURSH, FREDERICK. 1814 (mid-December 1813, *fide* Graustein). Flora Americae Septentrionalis. 2 vols.
- SHINNERS, LLOYD H. 1956. Non-validity of Nuttallian names in Fraser's Catalogue. RHODORA 57: 290-293.

SOME ADDITIONS TO THE ORCHID FLORA
OF PUERTO RICOHAROLD F. WINTERS AND CHARLES SCHWEINFURTH¹

THE Island of Puerto Rico, the smallest and easternmost of the Greater Antilles, is one of the more thickly populated areas of the world. It has a minimum of undisturbed vegetation and is not particularly rich in orchid species.

The orchids of Puerto Rico have been studied by various well-known taxonomists. Among them are Alfred Cogniaux whose studies were published in conjunction with Ignatius Urban (1903, 1909-10) at the beginning of the century. The collections and writings of Britton and Wilson (1924) comprise the most recent comprehensive taxonomic investigation. Fifty-four genera of orchids with 95 species are reported in their Island flora.

Subsequent exploration by various collectors (Winters, 1949) has brought to light additional orchid species. Some of these are widespread in the West Indies, but have not been reported previously from Puerto Rico. Others are rare in the area. The purpose of this report is to extend the recorded range of the several species to include Puerto Rico. Unless otherwise indicated, the identifications were made by Mr. Charles Schweinfurth.

Basiphyllaea angustifolia Schlter. *Winters 88*, collected Oct. 8, 1955, in late flowering and early fruiting stage. Terrestrial in deep leaf mold over serpentine rock. Maricao Insular Forest, at 2,000 feet altitude. Rare. Formerly known only from Prov. of Matanzas, Cuba.

Cranichis tenuis Reichb. f. *Winters 10*, collected Nov. 11, 1953. Terrestrial in organic accumulation over rocks. Maricao Insular Forest, on lee (dry) side of mountain toward Sabana Grande, at 2,000 feet altitude. Recorded only from Cuba.

Epidendrum cochleatum L. var. **triandrum** Ames. Collected by Rev. Donald Dod along Fish Hatchery Trail, Maricao Insular Forest. Identification by H. F. Winters. Recorded only from southern Florida. See plate 113, Correll, D. S., *Native Orchids of North America*, 399 pp., illus. Waltham, Mass.

Epidendrum jamaicense Lindl. *Winters 17*, collected Sept. 9, 1947, Dec. 17, 1954, epiphytic, Maricao Insular Forest, at 3,000 feet altitude; Nov. 22, 1954, La Mina Recreation Area, Luquillo Mts., at 2100 feet altitude; July 1939, collected by A. G. Kevorkian, Maricao Insular Forest. Also collected by F. H. Sargent No. 355, at El Yunque, on a tree, at 1969 feet altitude, April 10, 1938; and by Claud L. Horn No. 5862, on

¹ Respectively, Horticulturist, Federal Experiment Station, Mayaguez, Puerto Rico, and Research Fellow in Botany, Harvard University.

old tree trunks, at 2500 feet altitude, in Maricao Insular Forest, June 1939. Apparently fairly widespread in the West Indies.

Epidendrum oncioides Lindl. var. **gravidum** (Lindl.) A. H. & S. Collected Jan. 9, 1940, by A. G. Kevorkian, Maricao Insular Forest. Recorded from Middle America, from Mexico to Panama and Colombia.

Epidendrum vincentinum Lindl. *Winters 38*, collected Nov. 22, 1954, from slope of Mt. Britton, Luquillo Mts., epiphytic on trees and shrubs, 2900 feet altitude. This species is recorded from several of the West Indies, from Costa Rica, and Peru.

Habenaria strictissima Reichb. f. var. **odontopetala** (Reichb. f.) L. O. Wms. Collected Nov. 27, 1939, by A. G. Kevorkian, Maricao Insular Forest. This species occurs from Mexico to Costa Rica and in Cuba.

Lepanthopsis melanantha (Reichb. f.) Ames. *Winters 48*, collected Dec. 7, 1954, epiphytic along trail to San German from Camp Buena Vista, Maricao Insular Forest, at 3000 feet altitude. Rare. This species has been recorded from Cuba, Santo Domingo, and the west coast of Florida. See plate 99, D. S. Correll, l. c.

Liparis Saundersiana Reichb. f. *Winters 86*, collected Sept. 17, 1955, from Las Mesas near Mayaguez, 1100 feet elevation, terrestrial; Oct. 8, 1955, Maricao Insular Forest, at 2000 ft. altitude; Rev. Donald Dod, Oct. 1, 1955, Maricao Insular Forest. Previously recorded only from Jamaica.

Maxillaria rufescens Lindl. Collected by Rev. Donald Dod, El Verde area Luquillo Mts.; Maricao Insular Forest, at 2900 feet altitude. A widespread species in Central and South America and in the West Indies.

Pleurothallis Ghiesbreghtiana Rich. & Gal. (*P. longissima* Lindl.) *Winters 51*, collected Feb. 22, 1955, saxicolous on exposed mountain ridge, Maricao Insular Forest, at 2500 feet altitude. A species frequent in Middle America and the West Indies.

Polystachya foliosa (Hook.) Reichb. f. *Winters 11*, collected Oct. 8, 1955, epiphytic at base of shrubs. Maricao Insular Forest, at 2000 ft. altitude. An extremely variable species extending through the American Tropics.

Stelis pygmaea Cogn. *Winters 83*, collected in flower and fruit, July 31, 1955, epiphytic along mountain ridge, El Verde area, Luquillo Mts., at 2800 ft. altitude. A little plant confined to the West Indies.

Vanilla barbellata Reichb. f. *Winters 80*, collected July 2, 1955, from several locations in Guanica Forest, terrestrial, with vines clambering over shrubs and trees, sea level to 250 ft. altitude. Identified by Donovan S. Correll. Records of this species are from the Bahamas, Florida, and Cuba. See plate 57, D. S. Correll, l. c.

Vanilla Dilloniana Correll. *Winters 79*, collected Nov. 21, 1954, in fruit, hilltop, Cambalache Experimental Forest; June 28, 1955, common on mountain ridges, Maricao Insular Forest, at 2300 ft. altitude. Terrestrial, with vines clambering over shrubs and trees. Identified by Donovan S. Correll. This species is recorded from Florida, Cuba, and Santo Domingo. See plate 58, D. S. Correll, l. c.

LITERATURE CITED

- BRITTON, N. L., AND P. WILSON. 1924. Scientific Survey of Porto Rico and the Virgin Islands. Botany of Porto Rico and the Virgin Islands. N. Y. Acad. Sci. 5: 180-217.
- COGNIAUX, ALFRED, in URBAN. 1909-10. Symbolae Antillanae. 6: 293-696.
- URBAN, IGNATIUS, AND A. COGNIAUX, in URBAN. 1903. Symbolae Antillanae. 4: 162-184.
- WINTERS, H. F. 1949. Native Orchids of Puerto Rico. American Orchid Society Bulletin 18: 355-361.

GROWTH HABITS OF ARABIS PERSTELLATA

E. LUCY BRAUN

Since describing *Arabis perstellata* in 1940 (RHODORA 42: 47-48), I have had plants of this species almost continuously under observation, noting growth habit year by year. In the eighth edition of Gray's Manual (Fernald, 1950), this and what was known as *Arabis dentata* T. & G. are included in one species, *A. perstellata* E. L. Br., made up of the "typical" variety and var. *Shortii* Fern. (*A. dentata* (Torr.) T. & G.). In the New Britton and Brown Illustrated Flora (Gleason, 1952), these are maintained as distinct but related species, *A. perstellata* Braun and *A. Shortii* (Fern.) Gl. Neither manual adequately states the habit of growth of *A. perstellata*, the former stating "perennial, with strong branching base and definitely perennial leafy basal offsets"; the latter, with no statement, figures a single erect stem arising terminally from an ill-defined basal rosette.

Flowering plants may have from one to thirty flowering stems, all axillary; the central axis of the plants is a short leafy stem, very short at first, later elongating 1-3 cm. a year, with leaves more closely placed toward apex (Figs. 1, 2). This central or vegetative axis persists throughout the life of the plant. The first spring, the plant (from seed germinating sometime during the previous summer or fall) is a loose rosette of petioled leaves (Fig. 3). The central axis elongates, and by the second spring is 1-2 cm. long, the shriveled petioles of leaves of the previous season persisting near its base (Fig. 4). If flowers are produced the second spring, the flowering stem is definitely lateral, from the axil of a leaf of the previous season (Fig. 2). Year by year, henceforth, the central or vegetative axis elongates, and each



FIGS. 1-9. *Arabis perstellata*. FIG. 1. Plant at least 5 years old, showing central vegetative axis and three flowering branches of 1954 growth; below, at successively older nodes, stubs of flowering branches of previous years, and, at 1951 node, part of the stem of a vegetative offset. FIG. 2. A two-year old plant, with central vegetative axis and one flowering branch, and at *a*, shriveled petioles of leaves of the previous year. FIG. 3. Rosette in late May of first spring, wrinkled cotyledons at *a*. FIG. 4. Rosette in late May of second spring, with wrinkled petioles (*a*) of previous year. FIG. 1-4 ca. $\frac{1}{2}$ nat. size. FIG. 5. Flower, enlarged. FIG. 6. Silique and wingless seed, enlarged. FIG. 7. Stellate and simple hairs of upper leaf surface. FIG. 8. Stellate hairs of lower leaf surface. FIG. 9. Greatly enlarged scale-like hair.

year flowering stems arise from nodes of the year-old part of the stem. The old stem becomes hard and woody, and the bases of fruiting branches persist for several years, a group for each year of growth (Fig. 1). Occasionally, a vegetative axillary branch is formed (as at the 1951 node in Fig. 1), and henceforth elongates slowly as does the main axis. Very often, the old vegetative axis is decumbent and covered by an accumulation of humus, only the year-old leafy stem arising vertically above the ground surface.

Arabis perstellata, then, is definitely perennial by a slowly elongating central axis; axillary offsets occasionally arise; all flowering stems are lateral, and arise near the apparent base of the plant, i. e., from the year-old part of the stem.

Examination of herbarium specimens of the "chiefly biennial" *A. Shortii* suggests that the growth habit may be similar, and that at least some plants may live for more than two years.

A. perstellata differs from *A. Shortii* in being densely stellate-pubescent throughout, so densely that stems and foliage are whitish to grayish-green. Forked hairs of the calyx and pedicels (Fig. 5) are long and ascending; those of the silique (Fig. 6) very small and inconspicuous (similar to those that may be present on *A. Shortii*). Long stiff ascending hairs (like those of the upper leaf surface of *A. Shortii*) are scattered among the more numerous stellate hairs of the upper leaf surface (Fig. 7). The lower leaf surface (Fig. 8) and basal parts of stems are whitened with closely placed and interlocking stellate hairs. Occasional much larger scale-like hairs, with papillate arms, occur on the lower leaf surface (Fig. 9). Pedicels of *A. perstellata* at anthesis are nearly twice as long as the flower (those of *A. Shortii* about one-half as long) and later elongate to 10 mm.; petals are pink (instead of yellowish-white), 3-4 mm. long and half again as long as the sepals (instead of 2-3 mm. long and barely exceeding the sepals). Cauline leaves of *A. perstellata* are more deeply and irregularly toothed than those of *A. Shortii*, auricled or clasping on the middle and upper parts of the branches, tapering toward the base or slender-petioled and lyrate-pinnatifid on the lower part of branches; at least some of the leaves of the vegetative axis lyrate-pinnatifid, all slender-petioled.

The two taxa are evidently closely related, but apparently distinct species. *A. perstellata* is very abundant at and near the

type locality—wooded calcareous bluffs of Elkhorn Creek, Franklin County, Kentucky, in the Bluegrass region of that state.—UNIVERSITY OF CINCINNATI.

A CTYOTAXONOMIC STUDY OF THE GENUS HYMENOPAPPUS (COMPOS.TAE)

BILLIE L. TURNER

(Continued from page 289)

9a. *Hymenopappus scabiosaeus* L'Hér. var. *scabiosaeus*

Hymenopappus scabiosaeus L'Hér. *Hymenop.* 1: 1788.

Rothia caroliniensis Lam. *Jour. Hist. Nat.* 1: 17. 1792. *Hymenopappus caroliniensis* Porter, *Mem. Torr. Bot. Club* 5: 338. 1894. Photograph of type examined (GH): without date, sheet from Lamarek's herbarium.

Hymenopappus laxiflorus L'Hér. in DC. *Prodr.* 5: 658. 1836, as synonym.

Plants biennial, 40–150 cm. tall, the stems single from each tap-root, erect, much-branched, angled and grooved, glabrous to sparsely pubescent; leaves alternate, mostly glabrous above and variously pubescent beneath, in the first year simple or mostly once-pinnate, up to 25 cm. long, 4–5 cm. wide, forming a basal rosette; later formed stem-leaves mostly glabrous, 15–50 in number, not much reduced, once-pinnate to bipinnately dissected, with broad to narrowly linear segments; heads numerous, discoid, 25–80-flowered, on densely strigose or glabrate ultimate peduncles mostly 1 to 5 cm. long, these having at their bases conspicuous, membranous, petaloid bracts 5–14 mm. long, 3–10 mm. wide (rarely much reduced); involueral bracts white, petaloid, showy, equal or subequal, 7–15 mm. long, 4–8 mm. wide, membranous for half or more of their length; corollas white or creamy white, sweet scented, 3–5.5 mm. long, the tube stipitate-glandular, 2–3 mm. long, the throat funnelliform, 1.2–3 mm. long, with lobes reflexed, about equaling the lobes; achenes obpyramidal, 4-sided, 3.5–5 mm. long, short-pubescent, principally on the corners, with hairs 0.1–0.4 mm. long, the faces with 2–3 nerves; pappus of 14–18 small obovate scales 0.1–0.6 mm. long; anthers completely exserted, 2–2.5 mm. long; chromosome number not known.

DISTRIBUTION.—Scattered, apparently rare, principally in the Mississippi Valley region and southeastern United States: known by relatively few collections from Indiana, Illinois, Missouri, Oklahoma, Arkansas, and eastern Mississippi, Georgia, adjacent South Carolina, and Florida. In the southern part of its range it is commonly found in sandy pine woods; in the northern part it occupies rocky, sandy barrens and open disturbed areas (Fig. 45). April–June.

Hymenopappus scabiosaeus var. *scabiosaeus* is difficult to characterize because of the inadequacy of herbarium material from the states outside of Florida. Taken throughout its range the variety demonstrates considerable variability. In eastern Oklahoma and western Arkansas the taxon has races with more pinnately dissected, glabrate leaves than are typical for the variety in South Carolina and Florida. Likewise, the races in Illinois and Indiana tend to be distinguished by extremely large, ovate peduncular bracts. To apply formal nomenclature to these races would be unjustified on present-day evidence, since these same characters may reoccur (with much less frequency) in material from the Southeastern States. In addition, this regional variability is complicated by the seemingly complete intergradation of var. *scabiosaeus* with var. *corymbosus* at their area of contact in eastern Oklahoma and Kansas. Typical *Hymenopappus scabiosaeus* var. *scabiosaeus* can be distinguished from var. *corymbosus* by the key characters listed. In this region, however, clearly intermediate specimens are found. This rather complete intergradation between the two taxa, combined with their close, overall resemblance has been the principal reason for the reduction of *H. corymbosus* to varietal rank.

Early in the course of this study the author was inclined to treat *Hymenopappus scabiosaeus* in a broad sense, including within this species all the funnelform-throated, biennial taxa of the genus. Such a treatment, although perhaps justifiable on purely morphological grounds, would ignore the physiological, genetical, and ecological isolation of some included members. When such isolational barriers can be demonstrated or inferred, even when the morphological characters are somewhat intermediate between the specific and infraspecific level (as in *H. artemisiaefolius*), these other factors should be considered in drawing taxonomic lines. For this reason *H. scabiosaeus* and *H. artemisiaefolius* have been treated as two specific taxa instead of included together under one.

REPRESENTATIVE SPECIMENS.—**Arkansas.** BENTON CO.: Along R.R., Sulphur Springs, *E. J. Palmer* 2938 (MO). CARROLL CO.: Beaver, *E. J. Palmer* 5586 (MO, POM, US). **Florida.** ALACHUA CO.: 10 mi. W. of Gainesville, *Blanton* 6398 (POM). JACKSON CO.: near Marianna, *Curtiss* 6806 (GH, MO, NY, UC). LEON CO.: near Tallahassee, Apr. 1843, *Rugel* (MO,

NY). MARION CO.: E. of Flemington, *Moldenke 1084* (MO, NY, US). MARTIN CO.: dry place, May 2, 1941, *P. O. Schallert* (NY, UC). SUWANEE CO.: (w/o locality), June-July, 1898, *A. S. Hitchcock* (MO). WAKULLA CO.: Sopchoppy, *F. H. Sargent 6095* (SMU). **Georgia.** JENKINS CO.: dry sandy soil near Millen, *R. M. Harper 762* (GH, MO, NY, US). **Illinois.** CASS CO.: Beardstown, July, 1842, *C. A. Geyer* (GH, MO). KANKAKEE CO.: along R. R., St. Anne, *G. N. Jones 17280* (MO). MASON CO.: sandy barrens and prairie, June 18, 1845, *S. B. Mead* (GH, NY). **Indiana.** STARKE CO.: "frequent in three dry sandy fallow fields," 3 mi. N. and 1.5 mi. E. of North Judson, *Deam 49006* (GH). **Mississippi.** LOWDENS CO.: Columbus, *S. M. Tracey 1400* (GH, MO, US). **Missouri.** BARRY CO.: Eagle Rock, *B. F. Bush 104* (GH, MO, US). MISSISSIPPI CO.: cemetery 2 mi. W. of Charleston, *Steyermark 10259* (MO). SCOTT CO.: sandy open places, May 20, 1895 (1894), *H. Eggert* (GH, MO). STONE CO.: Baxter, *Bush 15587* (MO). **Oklahoma.** CHEROKEE CO.: 20 mi. N. E. of Tahlequah, *N. T. Knodos 71* (SMU). LE FLORE CO.: Pine Valley, *Goodman 2537* (GH, MO, NY, POM, RM). MAYES CO.: 2 mi. N. of Locust Grove, *Stratton 3718* (CAS). MCCURTAIN CO.: Bethel, dry pine hills, *Demaree 12691* (MO, NY). **South Carolina.** AIKEN CO.: Aiken, May 1869, *W. M. Canby* (DS, GH, MO, NY, US).

9b. *Hymenopappus scabiosaeus* var. *corymbosus* (T. & G.), comb. nov.

Hymenopappus corymbosus T. & G. Fl. N. Amer. 2: 372. 1842. *Rothia corymbosa* O. Ktze. Rev. Gen. 1: 361. 1891. Type examined (NY): "Arkans., Leavenworth." Probably collected in what is now present-day Oklahoma. (For an outline of Leavenworth's activities in this region, see McVaugh, 1947.)

Hymenopappus engelmannianus Kunth, Ind. Sem. Hort. Berol. 15. 1848. Ann. Sci. Nat., Series 3, 11: 229, 1849. The plant from which this description was taken was grown from seed that had been collected in Texas and sent to Kunth by Engelmann. In the United States National Herbarium there is a sheet of a Lindheimer collection (Fasc. III. Texas. Comal Co.: New Braunfels along Guadalupe R., April. May, 1846, *Lindheimer 438*) which has the name *H. Engelmannianus* written in by hand on the original label. It is likely that this specimen represents a collection of the plant from which the seed was taken, Lindheimer being an "intimate friend" and botanical correspondent of Engelmann (Geiser, 1948, p. 137). The original description is undoubtedly that of *H. scabiosaeus* var. *corymbosus*.

Hymenopappus sulphureus Rydb. in Britton, Man. 1007. 1901. Type examined (NY): Kansas. Riley Co.: "Stoney hills," May 23, 1895 *J. B. Norton 285*.

Plants biennial, 40-100 cm. high, the stems single from each tap-root (rarely two crowns forming, especially on injured plants), erect, usually much branched, angled and grooved, tomentose to nearly glabrate; leaves alternate, forming the first year a basal rosette, the primary leaves entire to variously lobed, the later formed rosette leaves becoming pin-

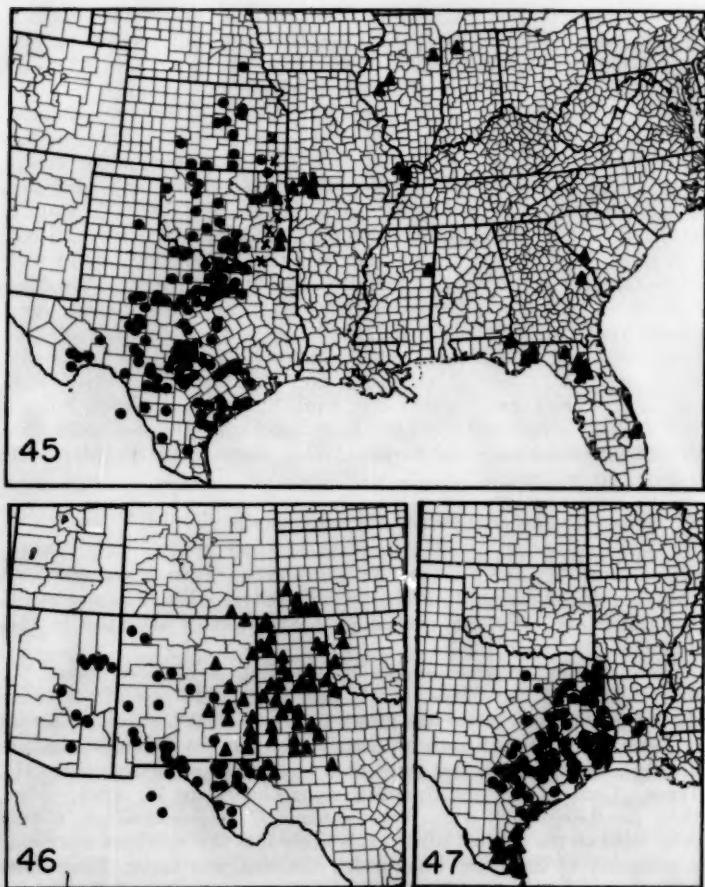


FIG. 45-47. Distribution of *Hymenopappus* species. FIG. 45. *Hymenopappus scabiosaeus* var. *scabiosaeus* (triangles); *H. s. corymbosus* (disks); intermediate specimens (X). FIG. 46. *H. flarescens* var. *flarescens* (triangles); *H. f. cano-tomentosus* (disks). FIG. 47. *H. artemisiaefolius* var. *artemisiaefolius* (disks); *H. a. riograndensis* (triangles).

nately dissected, 5-15 cm. long, 5-7 cm. wide, mostly glabrate or sparsely canescent above, more tomentose below, the ultimate divisions linear, acute, 2-8 mm. wide; stem leaves (on well developed plants) 15-30, becoming reduced upward; heads campanulate, numerous (40-100), discoid, 20-60-flowered, on densely strigose ultimate peduncles 0.5-3

cm. long, these without conspicuous petaloid bracts at their bases, involucre campanulate, principal bracts 5–9 mm. long, 2–4 mm. wide, glabrate above, pubescent below, yellowish-white or white membranous for 2–4 mm. from the acute to narrowly obtuse tip; corollas white or creamy white, 3–4 mm. long, sweet scented, the tube sparsely glandular, 2–3 mm. long, the throat funnelform 1–1.5 mm. long, with lobes reflexed, the lobes equal to or nearly as long as the throat; achenes obpyramidal, 4-sided, 3–4 mm. long, short-pubescent (especially on the corners) with hairs 0.1–0.5 mm. long, the achene faces 2–3-nerved; pappus of 14–18 obtuse or spatulate scales, 0.2–0.8(–1) mm. long; anthers completely exerted, 1.6–2.5 mm. long; $n = 17$.

DISTRIBUTION.—Open prairies in heavy, calcareous soils and on limestone outcrops from southern Nebraska, central Kansas, Oklahoma to southern Texas and adjacent Mexico (Fig. 45). Late March–July.

The variety is well marked throughout the greater portion of its range, but where it comes in contact with the closely related var. *scabiosaeus* in eastern Oklahoma and Kansas there is complete intergradation between the two taxa (intermediate specimens are designated by x on the distribution map). Typical var. *corymbosus* may be distinguished from var. *scabiosaeus* by its short, narrow involucre bracts, and by its ebracteate peduncles. Typical var. *scabiosaeus* has long, broad involucre bracts, and conspicuous white, membranous peduncular bracts. Likewise, in western Texas, where var. *corymbosus* comes in contact with the yellow-flowered *H. flavescens* var. *flavescens* there appears to be considerable intergradation of their characters, especially as regards leaf- and corolla-shape, perhaps indicating considerable hybridization and introgression in the past between these species. (For implications of such hybridization see discussion under *H. flavescens* var. *flavescens*.) Evidence of present-day hybridization between these two taxa has been found only in a few specimens from Tom Green Co., Texas (Havard 22), where their ranges overlap. *H. scabiosaeus* var. *corymbosus* and *H. flavescens* var. *flavescens* are kept genetically separate, for the most part, at their regions of overlap, by distinct seasonal differences in principal flowering times, the former reaching its peak 3–4 weeks before the latter (Fig. 44).

In Texas, the distribution of *H. scabiosaeus* var. *corymbosus* is especially interesting. It is found almost exclusively on heavy clay prairies, its range stopping abruptly at the margins of the

sandy soils of pine and post oak woods.¹² *H. artemisiaefolius* var. *artemisiaefolius* occupies these latter habitats. In spite of their extensive region of apparent contact, there is little evidence of intergradation, hybridization or introgression between the two taxa, there presumably being almost complete ecological isolation (possible exceptions discussed below). Lindheimer, an early botanical explorer in Texas, was probably the first to note the ecological distinction between these species, noting in 1846 on a field label of one of his collections the following (Lindheimer 438: GH):

Hymenopappus corymbosus

In patches on Prairies and margin of wood in fertile rather heavy soil (*H. artemisiaefolius* in sandy soil)

4.5 F. L. n. Br.
4.6

In the Rio Grande Valley of Texas *H. scabiosaeus* var. *corymbosus* becomes quite variable as regards several characters, possibly the result of contamination from *H. artemisiaefolius* var. *artemisiaefolius* or its var. *riograndensis*. This area of Texas may prove to hold the answer to some of the evolutionary problems of the *H. artemisiaefolius*—*H. scabiosaeus* complex. The lack of herbarium material from this region has made the task of evaluating variability of the represented taxa impossible, but it seems clear that the area occupies a critical position as concerns the origin, migration, and subsequent evolution of the funnellform-throated *Hymenopappi*.

A peculiar group of specimens from the Gulf Coastal Prairies in Matagorda and Ft. Bend counties, Texas (Fisher s.n.; Palmer 9668; Fisher 40093), perhaps points to the existence of yet another closely related variety within the *H. scabiosaeus* complex. These specimens are like var. *corymbosus* except for their dwarfish, scapose habit (scarcely exceeding 30 cm. in height). However, in light of our present knowledge, it seems best to consider these specimens as representatives of a rather distinct race of

¹² One must be familiar with the peculiar long-distance interfingering of prairie with pine and oak woodland in south-central Texas to appreciate fully this ecological isolation. Dots, which seem on the map to be included in the range of *H. artemisiaefolius* var. *artemisiaefolius*, are, in actuality, on well defined prairie strips within this region.

the variety, at least until further field and variability studies are made on the populations represented in this area.

REPRESENTATIVE SPECIMENS.—**Kansas.** ANDERSON CO.: 1.5 mi. N. of Welda, *R. L. McGregor* 4277 (GH)*¹² BARBER CO.: 6 mi. W. of Hardtner, *Rydberg & Imler* 626 (NY). BUTLER CO.: August, *S. F. Poole* 1302 (US). CLOUD CO.: Miltonvale, *Benke* 5181 (GH). COWLEY CO.: (w/o locality), May, 1898, *M. White* (MO). DICKINSON CO.: Solomon, *Benke* 4313 (US). EDWARDS CO.: prairies, *A. Finch* 136 (MO). GEARY CO.: Ft. Riley, *E. E. Gayle* 469 (NY). HARPER CO.: 2 mi. W. of Athony, *Rydberg & Imler* 611 (NY). LABETTE CO.: Oswego, bluffs 4 mi. W. of town, *Rydberg & Imler* 326 (MO, NY)*. MARION CO.: Florence, June 18, 1885, *Pringle* (GH). RILEY CO.: Stony hills, *J. B. Norton* 285 (GH, MO, NY, RM, US). SALINE CO.: 6 mi. N. of Salina, *Hancin* 2162 (NY). WILSON CO.: 6 mi. S. W. of Nco-desha, *W. H. Horr* E526 (RM, SMU, US, WS). **Nebraska.** LANCASTER CO.: Lincoln, Aug. 26, 1896, *G. G. Hedgcock* (MO). **Oklahoma.** ADAIR CO.: Westville, May 19, 1921, *Ensign* (NY)*. ATOKA CO.: 8 mi. S. of Atoka, *M. Hopkins & A. & R. Nelson* 1073 (MO, RM). BLAINE CO.: near Longdale, *G. W. Stevens* 831 (GH). CADDO CO.: 3 mi. E. of Hydro, *Hubricht, Shoop, & Heinze* B1387 (MO). CARTER CO.: S. of Turner Falls, *Demaree* 12298 (MO, NY, UC, US). CLEVELAND CO.: Norman, *W. H. Emig* 493 (MO, US). COMANCHE CO.: Fort Sill, *J. Clemens* 11843 (CAS, GH, MO, RM). ELLIS CO.: near Shattuck, *Clifton* 3452 (GH, MO, NY). GRADY CO.: on False Washita between Fort Cobb and Fort Arbuckle, 1868, *E. Palmer* 447 (NY, US). JOHNSTON CO.: Tishomingo, *Cory* 58892 (SMU). LATIMER CO.: Limestone Gap, June, 1875, *G. D. Butler* (GH, MO)*. LOGAN CO.: Guthrie, *G. W. Stevens* 3224 (GH). MAJOR CO.: near Cleo, *G. W. Stevens* 786 (DS, GH, MO). MURRAY CO.: Platt Nat'l. Park, *Demaree* 12230 (MO, NY, UC). PONTOTOC CO.: S. of Ada, near city limits, *G. T. Robbins* 2483 (SMU, UC). PUSHMATAHA CO.: near Finley, *E. J. Palmer* 39397 (GH)*. ROGERS CO.: Catoosa, *B. F. Bush* 1140 (MO, NY)*. TULSA CO.: R. R. near Tulsa, May 10, 1940, *H. A. Hawk* (MO). WOODS CO.: near Alva, May 22, 1913 (*G. S. Stevens* 547 (DS, MO, NY, US). **Texas.** ARKANSAS CO.: W. of Tivoli on coastal prairie, *Whitehouse* 12075 (SMU). BEE CO.: Beeville, *M. E. Jones* 29436 (POM). BELL CO.: near Temple, *S. E. Wolff* 503 (US). BEXAR CO.: 4 mi. N. W. of San Antonio, *M. Clara* 650 (CAS, POM, UC). BLANCO CO.: between Johnson City and Marble Falls, *C. L. & A. A. Lundell* 14544 (SMU, US). BREWSTER CO.: 38 mi. S. of Marathon, *Ferris & Duncan* 2832 (CAS, DS). BROOKS CO.: roadside, *Clover* 823 (NY). BURNET CO.: 10 mi. S. E. of Marble Falls, Rd. to Bee Caves, *L. H. Shinnars* 7239 (SMU). CALLAHAN CO.: Clyde, *E. J. Palmer* 13683 (MO). COLLINS CO.: 2 mi. S. of McKinney, *Timmons* 436 (NY). COMAL CO.: New Braunfels, *Lindheimer* 929 (GH, MO, NY, SMU, UC, US). COOKE CO.: 7 mi. N. of Gainesville, *Cory* 56131 (SMU). DALLAS CO.: rocky prairies near Dallas, *Reverchon* 1508 (GH, MO, NY, US). DENTON CO.:

¹² Specimens intermediate toward var. *scabiosaeus* are indicated by an asterisk (*); these are shown on the distribution map (Fig. 45) with an "x."

2.5 mi. S. of Sanger, *Cory* 53240 (SMU). EDWARDS CO.: Ranch Expt. Station, *Cory* 19029 (GH). ERATH CO.: 8 mi. N. E. of Stephenville, *F. W. Gould* 5666 (SMU). FANNIN CO.: Bonham, May, 1896, *J. M. Milligan* (US). FORT BEND CO.: Richmond, *G. L. Fisher* 40093 (CAS, US). GILLESPIE CO.: 1 mi. E. of Willow City, *Cory* 53625 (SMU). GOLIAD CO.: prairies N. of Goliad, Apr. 8-9, 1900, *H. Eggert* (MO). GRAYSON CO.: 1.7 mi. N. of Collinsville, *Shinners* 12402 (SMU). KARNES CO.: 6 mi. N. of Tulsita, *J. F. Hennen* 605 (SMU). KAUFMAN CO.: 2 mi. E. of Terrell, *Shinners* 10101 (SMU). KERR CO.: Kerrville, *A. A. Heller* 1638 (GH, MO, NY, UC, US, WS). LAMAR CO.: Arthur City, along Red R., R. R. embankment, *Cory* 56076 (SMU, US).^{*} LASALLE CO.: sands, Cotulla, Apr. 29, 1905, *J. Reverchon* (SMU). LLANO CO.: near Llano, *S. E. Wolf* 1586 (US). MCLENNAN CO.: gravel pit, mouth of White Rock Cr., *L. D. Smith* 392 (US). MATAGORDA CO.: Bay City, *E. J. Palmer* 9668 (DS, MO, US). MEDINA CO.: 1 mi. W. of D'Hanis, *Shinners* 7301 (SMU). MILLS CO.: 6.5 mi. S. of Goldthwaite, *Cory* 13081 (GH). MITCHELL CO.: red-bed slopes above Lake Hollywood, *Pohl* 4745 (SMU). MONTAGUE CO.: W. of Nocoona, highway 82, *Whitehouse* 15050 (SMU). NOLAN CO.: Eagle Cr., Blackwell, *Studhalter* 1198 (US). PALO PINTO CO.: vicinity of Mineral Wells, *Gillespie* 5220 (DS, US). PARKER CO.: Weatherford, *Tracy* 8544 (GH, MO, NY, US). PECOS CO.: 7 mi. N. of Iraan, cut-off from highway 290, near Sheffield, *Warnock & Turner* 807 (SMU). REAL CO.: 29 mi. E. of Rocksprings, *Shinners* 7338 (SMU). SAN PATRICIO CO.: near Mathis, *McKelvey* 1711 (GH, POM). SOMERVELL CO.: 5 mi. W. S. W. of Glen Rose, *Shinners* 10072 (SMU). SUTTON CO.: Sonora Expt. Station, *Eggleston* 16700 (NY). TARRANT CO.: Polytechnic, *Ruth* 301 (MO, RM, US). TAYLOR CO.: 2 mi. W. of Buffalo Gap, *Tolstead* 7036 (MO, UC). TERRELL CO.: 7 mi. E. of Longfellow, along highway 90, *Warnock & Turner* 592 (SMU). THROCKMORTON CO.: 11 mi. N. of Throckmorton, *Cory* 37257 (GH). TOM GREEN CO.: Knickerbocker Rancho, Dove Cr., *Tweedy* 316 (US). TRAVIS CO.: Austin, *Tharp* (CAS, MO, SMU, UC). UVALDE CO.: W. of Uvalde, *M. E. Jones* 28164 (DS, POM, UC). VAL VERDE CO.: N. of Del Rio, *M. E. Jones* 28165 (DS, POM, UC). VICTORIA CO.: Victoria, *Tracy* 9048 (GH, MO, NY, US). WALLER CO.: dry prairies, Hempstead, *E. Hall* 357, in part (GH, POM, US). WASHINGTON CO.: (w/o locality), April 21, 1939, *E. Brackett* (GH). WEBB CO.: E. of Laredo, *A. C. Martin* 102 (US). WICHITA CO.: 1.6 mi. W. of Electra, *Whitehouse* 9775 (US). WILBARGER CO.: 16.9 mi. W. of Electra, Waggoner pastures, *Whitehouse* 9845 (SMU). WISE CO.: 2 mi. W. S. W. of Chico, *Shinners* 1232 (SMU).

MEXICO. Coahuila. Municipio de Muzquiz, hacienda La Rosita, June 26, 1936, *Wynd & Mueller* 294 (GH, MO, NY, US).

10a. *Hymenopappus artemisiaefolius* DC. var. *artemisiaefolius*

Hymenopappus artemisiaefolius DC. Prod. 5: 658. 1836. *Rothia artemisiaefolia* O. Ktze. Rev. Gen. 1: 361. 1891. Photograph of type examined (US): "Texas, fl. sordide albi, 1832, *M. Berlandier* 1532." Type in the Delessert Herbarium.

Plants biennial, 40–90 cm. high, tomentose to nearly glabrate; larger rosette leaves, 8–18 cm. long, simple to once-pinnate with broad primary divisions, 6–30 mm. wide, mostly densely tomentose on the lower surface, becoming glabrate above; stem leaves (6–)8–16, not much reduced upward; heads 30–60 per stem, campanulate, on ultimate peduncles 1–4(–6) cm. long; principal involueral bracts broadly elliptic to ovate, 6–12 mm. long, 3–7 mm. wide, snowy-white-membranous for about $\frac{1}{2}$ their length or more (often tinged with red); corollas rosy-vinaceous to rarely completely white, 3.5–5 mm. long, the tube moderately glandular, 2.5–3 mm. long, the throat funnelform 1–1.5 mm. long, with lobes reflexed, as long as, or 1.5 times longer than the lobes; achenes obpyramidal, 4-sided, 3.5–4 mm. long, principally pubescent on the corners with short white hairs 0.3–0.6 mm. long, the faces 2–3-nerved; pappus of 16–18 oblong scales 0.5–1(–1.5) mm. long; anthers completely exserted, 2–2.5 mm. long; chromosome number $n = 17$.

DISTRIBUTION.—Confined to the sandy pine and post-oak woods of eastern Texas and adjacent Louisiana (Fig. 47). March–May.

The closest relationship of this species is undoubtedly with the *Hymenopappus scabiosaeus* complex (probably var. *scabiosaeus*). It is not treated as a variety of that species because it is morphologically distinct throughout its range and apparently does not intergrade or hybridize with peripheral taxa (except possibly on a local scale with *H. scabiosaeus* var. *corymbosus* and to a limited degree with its own var. *riograndensis* in southern Texas). This treatment is justifiable on morphological, ecological, genetical, as well as practical grounds. Although the taxon is in apparent close contact with *H. scabiosaeus* var. *corymbosus* over at least 1000 miles (linearly along the peripheral area), along this entire line of contact the two taxa remain distinct, apparently as a result of edaphic isolation. *H. scabiosaeus* var. *corymbosus* occurs principally in heavy, clay soils while *H. artemisiaefolius*, as mentioned above, occurs principally in sandy soils. (For further information see discussion under *H. scabiosaeus* var. *corymbosus*.)

H. artemisiaefolius var. *artemisiaefolius* intergrades to a large extent with *H. a. riograndensis*, of southern Texas. This is reflected in the tendency toward a larger pappus, less membranous involueral tips, and fewer-leaved stems as one approaches this region from the north.

H. artemisiaefolius var. *riograndensis* could possibly represent the progenitor of this whole eastern complex (see discussion under that variety). Future field work should do much to

clarify the limits of the three related taxa of this area: *H. artemisiaefolius* var. *artemisiaefolius*, *H. artemisiaefolius* var. *riograndensis*, and *H. scabiosaeus* var. *corymbosus*.

REPRESENTATIVE SPECIMENS.—**Louisiana.** NATCHITOCHES PARISH: Chopin, *E. J. Palmer* 7328 (CAS, MO, NY, US). RAPIDES PARISH: Alexandria, Aug., 1840, *Hale* (NY). **Texas.** ANDERSON CO.: Palestine, Apr. 14, 1929, *Tharp* (NY). AUSTIN CO.: Mills Cr., 16 mi. W. of San Felipe, Mar., 1844, *Lindheimer* 107 (46) (GH, MO, SMU, UC, US). BASTROP CO.: Bastrop, Apr. 4, 1939, *Tharp* (NY, WS). BEXAR CO.: San Antonio, *E. H. Wilkinson* 110 (MO). BOWIE CO.: pine woods N. of Texarkana, June 12, 1898, *Eggert* (MO, NY). BRAZOS CO.: College Station, Apr. 28, 1927, *H. B. Parks* (RSA). BURLESON CO.: 7 mi. S. E. of Caldwell, *Gould & Celerier* 5447 (SMU, UC). CALDWELL CO.: 6 mi. S. E. of Luling, *Cory* 48875 (SMU). CASS CO.: Bivins, May 12, 1941, *O. McGinnis* (CAS, GH, MO, SMU, UC). COLORADO CO.: Columbus, June 11, 1910, *H. H. Rusby* (NY). COMAL CO.: New Braunfels *Dapprich* 6740 (SMU). DALLAS CO.: sands, Dallas, *J. Reverchon* 527 (US). DENTON CO.: 7 mi. N. E. of Roanoke, *Whitehouse* 15979 (SMU). DEWITT CO.: Cuero, *Bray* 136 (US). FAYETTE CO.: Colony, (8 mi. N. of Flatonia), *E. W. Crawford* 31 (US). FREESTONE CO.: 12 mi. S. of Fairfield, *Shinners* 7108 (SMU, WS). GONZALES CO.: Ottine, *Tharp* 44472A (RSA). GUADALUPE CO.: swampy roadside between Luling and Seguin, *M. C. Metz* 3066 (NY). HARDIN CO.: Fletcher, *E. J. Palmer* 9541 (DS, MO, US). HARRIS CO.: Houston, *Bush* 35 (GH, MO, NY). HARRISON CO.: Marshall, *E. J. Palmer* 5318 (MO, POM, US). HENDERSON CO.: 14.6 mi. S. of Athens, *Hennen* 274 (SMU). HOUSTON CO.: Grapeland, *Tharp* 926 (GH, US). JASPER CO.: S. of Jasper, *C. L. & A. A. Lundell* 11200 (SMU). JEFFERSON CO.: Port Arthur (&) Beaumont, May 15, 1927, *I. Kolthoff* (US). LEON CO.: Normange, *Fisher* 41269 (CAS, US). MCLENNAN CO.: Waco, *L. Pace* 96 (MO). MARION CO.: Jefferson, *B. B. Harris* 459 (US). MATAGORDA CO.: Bay City, *E. J. Palmer* 9629 (DS, MO, US). MONTGOMERY CO.: 7 mi. S. of Conroe, *Shinners* 7742 (SMU). MORRIS CO.: Daingerfield St. Park, *D. S. & H. B. Correll* 12440 (SMU). NEWTON CO.: 4 mi. S. E. of Newton, *Shinners* 7656 (RM, SMU, UC). ORANGE CO.: Vidor, *M. B. Wood* (MO, UC). PANOLA CO.: 18 mi. N. W. of Carthage, *Shinners* 7595 (GH, SMU). POLK CO.: Livingston, *E. J. Palmer* 5249 (MO, US). REFUGIO CO.: (w/o locality), *H. C. Benke* 5439 (GH). ROBERTSON CO.: 3.75 mi. S. E. of Hearne, *Cory* 55732 (SMU, US, WS). RUSK CO.: Henderson, Apr. 16, 1943, *M. Riedel* (MO). SABINE CO.: 15 mi. N. of Jasper, *Shinners* 7637 (SMU). SAN AUGUSTINE CO.: San Augustine, (w/o date), *G. L. Crockett* (US). SHELBY CO.: 16 mi. S. E. of Center, *Shinners* 7627 (SMU). SMITH CO.: Tyler St. Park, *Cory* 63392 (GH, SMU). TRAVIS CO.: Austin, *Tharp* 1378 (UC, US). TYLER CO.: 7 mi. S. of Woodville, *Whitehouse* 23303 (SMU). VAN ZANDEL CO.: 6.7 mi. E. of Grand Saline, *Van Vleet* 1105 (SMU). VICTORIA CO.: 10.5 mi. W. of Victoria, *Cory* 55117 (SMU, US). WALKER CO.: (w/o locality), *R. A. Dixon* 512 (CAS, US). WALLER CO.: Hempstead, *E. Hall* 357 (GH, MO, NY). WASH-

INGTON CO.: Brenham, Apr. 21, 1935, V. Lehman (NY). WILSON CO.: Sutherland Springs, M. E. Jones 29/36 (MO). WOOD CO.: Mineola, Reverchon 2575 (MO, SMU).

10b. *Hymenopappus artemisiaefolius* var. *riograndensis* var. nov.

Herbae biennes, caulibus 2-8 foliatis, 45-100 cm. altis; foliis inferioribus integris 1-pinnatisve, 10-20 cm. longis, 2-5 cm. latis; pedunculis ebracteatis, 2-5 cm. longis; inflorescentiis magnis laxe cymoso-paniculatis, 20-60-capitulatis; involueris campanulatis, bracteis 5-7 mm. longis, 2-4 mm. latis, apice ad 1 mm. membranaceis; flosculis 3-3.5 mm. longis, tubo 2 mm. longo, lobis acutis ad 1.5 mm. longis; achaeniis villosis 4-5 mm. longis, capillis albidis 1-1.2 mm. longis; pappo conspicuo, squamellis lineari-oblongis, 1.5-2 mm. longis.

Plants biennial, 45-100 cm. high; principal rosette leaves 10-20 cm. long, 2-5 cm. wide, tomentose on both surfaces, simple to once-pinnate with broad, coarsely toothed divisions; stem leaves 2-8, much reduced upward; heads 20-60 per stem, campanulate, 40-60-flowered, on slender, bractless ultimate peduncles 2-5 cm. long; inflorescence a large, open cymose panicle, often comprising $\frac{3}{4}$ of the plant height; principal involueral bracts 5-7 mm. long, 2-4 mm. wide, the apex narrowly obtuse or acute with an inconspicuous, yellow-membranous tip 1(2) mm. long or less; corollas "yellow-reddish," 3-3.5 mm. long, the tube sparsely glandular, 2 mm. long, the throat campanulate-funnelform, 1.5 mm. long with lobes reflexed, 1-1.2 times longer than the acute lobes; achenes 4-5 mm. long, pubescent principally on the corners with white hairs (0.8-)1-1.2 mm. long; pappus of 16-18 linear oblong scales, 1.5-2 mm. long; anthers exserted, 2-2.5 mm. long; chromosome number $n = 17$. Type: Texas. Brooks Co.: 2 mi. S. of Falfurrias, in deep sandy soil. March 20, 1952, F. B. Jones 695 (SMU). Phototypes WS, TEX.

DISTRIBUTION.—Rio Grande Valley of Southern Texas in open gravelly or sandy-clay soils of the lower Gulf Coastal Plain. (Fig. 47).

This plant is a distinct variety which differs from *Hymenopappus artemisiaefolius* var. *artemisiaefolius* in a number of characters, including its more pubescent achenes, larger pappus, smaller corollas, fewer stem leaves, involueral bracts with inconspicuous membranous tips, and ebracteate peduncles. The latter two characters seem to link the variety to *H. scabiosaeus* var. *corymbosus*, but the total characters are those of *H. artemisiaefolius*. Further, the morphological characters listed above intergrade to a large extent with those of *H. artemisiaefolius* var. *artemisiaefolius* where the peripheral ranges of these two varieties approach each other. As yet, no similar intergradation has been found with *H. scabiosaeus* var. *corymbosus*. It is unlikely that the specimens cited represent hybrids or hybrid

swarms between this species and *H. artemisiaefolius* var. *artemisiaefolius*, since the variety has characters which are peculiar to itself, such as its long pappus and achenial hairs (remarkably similar to those of the *H. filifolius* complex).

Hymenopappus in the Rio Grande Valley of southern Texas is in critical need of field study both because of the scarcity of material from the area and because of the variability shown by the few specimens of the genus collected in this region. With the accumulation of more specific information, present concepts as to the relationship and status of var. *riograndensis* may have to be changed, but from the evidence available it seems best to consider it no more than a well marked variety of *H. artemisiaefolius*.

REPRESENTATIVE SPECIMENS.—**Texas.** BROOKS CO.: 2 mi. S. of Falfurrias, *F. B. Jones* 695 (SMU); near Falfurrias, *Perkins & Hall* 2857 (POM). CAMERON CO.: Point Isabel, *R. Runyon* 224 (US). KENEDY CO.: Norias Division of King Ranch, *M. C. Johnston* 54595 (TEX); KLEBERG CO.: Santa Gertrudis Division of King Ranch, *M. C. Johnston* 54483 (TEX). HIDALGO CO.: 10 mi. N. of San Manuel, highway 281, *R. Runyon* 2634 (US). REFUGIO CO.: 5.5 mi. S.E. of Austwell, *Cory* 49078 (GH, SMU). (This specimen approaches var. *artemisiaefolius*.) WILLACY CO.: loose sand prairie a few mi. W. of Redfish Bay, *M. C. Johnston* 54562 (TEX).

EXCLUDED SPECIES

- Hymenopappus anthemoides* Juss. Ann. Mus. Par. 2: 426. 1803. = HYMENOXYS ANTHEMOIDES (Juss.) Cass.
Hymenopappus douglasii Hook. Fl. Bor. Am. 1: 316. 1834. = CHAENACTIS DOUGLASII (Hook.) Hook. & Arn.
Hymenopappus glandulosus (S. Wats.) Rydb. N. Amer. Fl. 34: 38. 1914. = HYMENOTHRIX GLANDULOSUS S. Wats.
Hymenopappus glaucus Spreng. Syst. Veget. 3: 449. 1826. = CEPHALOPHORA GLAUCA Cav.
Hymenopappus integrifolius (Nutt.) Spreng. Syst. Veget. 3: 449. 1826. = POLYPTERIS INTEGRIFOLIUS Nutt.
Hymenopappus ligulaeflorus Nelson, Wyoming Expt. Sta. Bull. 28: 135. 1896. = HYMENOXYS RICHARDSONII (Hook.) Cockerell.
Hymenopappus matricarioides Spreng. Syst. Veget. 3: 450. 1826. = AGERATUM MATRICARIOIDES (Spreng.) Less.
Hymenopappus nelsoni (Greenman) Rydb. N. Amer. Fl. 34: 49. 1914. = HYMENOTHRIX GLANDULOSA var. NELSONII Greenman.
Hymenopappus nevadensis Kellogg, Proc. Calif. Acad. 5: 46. 1873. = CHAENACTIS NEVADENSIS (Kellogg) Gray.
Hymenopappus palmeri (Gray) Hoffm. in Engler & Prantl. Nat. Pfl. 45: 256. 1897. = HYMENOTHRIX PALMERI Gray.
Hymenopappus pedatus Cav. ex Lag. Gen. et. Sp. Nov. 28. 1816. = FLORESTINA PEDATA (Cav.) Cass.

Hymenopappus wislizeni var. *setiformis* M. E. Jones, Contrib. West. Bot. 12: 47. 1908. = *HYMENOTHRIX WISLIZENII* Gray

Hymenopappus wrightii (Gray) H. M. Hall, Univ. Calif. Publ. Bot. 3: 179. 1907. = *HYMENOTHRIX WRIGHTII* Gray.

Hymenopappus wrightii var. *viscidulus* Jepson, Man. Fl. Pl. Calif. 1128. 1925. = *HYMENOTHRIX WRIGHTII* Gray.

In addition, the following species of *Rothia* Lam., *sensu* O. Kuntze (1898) are not *Hymenopappus*: *Rothia degenerica*, *Rothia intermedia*, *Rothia pinnata*, *Rothia pinnata pallida*, *Rothia pinnata purpurescens*, *Rothia pusilla*.

THE PLANT RESEARCH INSTITUTE, THE UNIVERSITY OF TEXAS, AUSTIN, TEXAS.

BIBLIOGRAPHY

- AXELROD, D. I. 1948. Climate and evolution in western North America during middle Pliocene time. *Evolution* 2: 127-144.
- BALTZER, E. A. 1944. A monographic study of the genus *Palafioria* and its immediate allies. *Ann. Mo. Bot. Gard.* 31: 249-278.
- BENTHAM, G. 1873. Notes on the classification, history, and geographical distribution of Compositae. *Jour. Linn. Soc. Bot.* 13: 335-582.
- , and J. D. HOOKER. 1873. Compositae. *Genera Plantarum* 2: 163-554.
- BIDDULPH, S. F. 1944. A revision of the genus *Gaillardia*. *Res. Studies State College of Washington* 12: 195-256.
- BRITTEN, J. and B. B. WOODWARD. 1905. Bibliographical notes XXV. L'Héritier's botanical works. *Jour. Bot.* 43: 266-273.
- CHANEY, R. W. 1947. Tertiary centers and migration routes. *Ecol. Monogr.* 17: 139-148.
- CONSTANCE, L. 1937. The genus *Eriophyllum* Lag. *Univ. Calif. Publ. Bot.* 18: 69-135.
- CRONQUIST, A. 1955. Phylogeny and taxonomy of the Compositae. *Am. Midl. Nat.* 53: 478-511.
- CRUM, E. 1940. A revision of the genus *Monolopia*. *Madroño* 5: 250-270.
- EVERLY, M. L. 1947. A taxonomic study of the genus *Perityle* and related genera. *Contrib. Dudley Herb.* 3: 375-396.
- GEISER, S. W. 1948. Naturalists of the Frontier. Dallas. Southern Methodist University Press. 296 pp.
- GLEASON, H. A. 1906. A revision of the North American Vernonieae. *N. Y. Bot. Gard. Bul.* 4: 144-243.
- . 1923. Evolution and geographical distribution of the genus *Vernonia* in North America. *Amer. Jour. Bot.* 10: 187-202.
- GRAY, A. 1849. *Plantae Fendlerianae*. *Mem. Am. Acad. Arts Sci. n.s.* 4: 102.
- . 1886. Compositae. *Synoptical Flora of North America*. 2d ed. 1st: 48-455.
- HEISER, C. B. JR. 1944. Monograph of *Psilostrophe*. *Ann. Mo. Bot. Gard.* 31: 279-301.
- . 1945. A revision of the genus *Schkuhria*. *Ann. Mo. Bot. Gard.* 32: 265-278.
- HOFFMAN, O. 1897. Compositae. In Engler and Prantl, *Die Natürlichen Pflanzenfamilien* 4th: 87-391.
- INTERNATIONAL CODE OF BOTANICAL NOMENCLATURE. 1952. *Regnum Vegetabile* 3: 1-228.

- JOHANSEN, D. A. 1940. Plant Microtechnique. New York. McGraw-Hill Book Co. 523 pp.
- JOHNSTON, I. M. 1923. Diagnoses and notes relating to the Spermatophytes chiefly of North America. Contrib. Gray Herb. n.s. 68: 92-98.
- KUNTZE, O. 1891. Compositae. Revisio Generum Plantarum 1: 303-374.
- . 1898. Compositae. Revisio Generum Plantarum 3: 127-185.
- LAMARCK, J. 1792. Jour. Hist. Nat. 1: 16-19.
- LANJOUW, J. and F. A. STAFLEU. 1952. Index Herbariorum. Regnum Vegetabile 2: 1-167.
- McCLINTOCK, B. A. 1929. A method for making aceto-carminic smears permanent. Stain Tech. 4: 53-56.
- McVAUGH, R. 1947. The travels and botanical collections of Dr. Melies Conkling Leavenworth. Field and Lab. 15: 57-70.
- MULLER, C. H. 1952. Ecological control of hybridization in *Quercus*: a factor in the mechanism of evolution. Evolution 6: 147-161.
- ROSE, J. N. 1891. List of plants collected by Dr. E. Palmer in Arizona in 1890. Contrib. U. S. Nat. Herb. 1: 117-127.
- RYDBERG, P. A. 1914. Helenieae. Hymenopappanæ. N. Amer. Flora 34: 43-63.
- SMALL, J. 1919. The origin and development of the Compositae. London. William Wesley & Son. 334 pp. (Reprinted from the New Phytologist Vol. 16-18, 1917-1919.)
- SPEESE, B. M. and J. T. BALDWIN, JR. 1952. Chromosomes of *Hymenoxys*. Amer. Jour. Bot. 39: 685-688.
- STEBBINS, G. L. 1950. Variation and Evolution in Plants. New York. Columbia University Press. 643 pp.
- . 1952. Aridity as a stimulus to plant evolution. Amer. Natur. 86: 33-44.
- STOCKWELL, P. 1940. A revision of the genus *Chaenactis*. Contrib. Dudley Herb. 3: 89-168.
- WALTERS, J. L. 1952. Heteromorphic chromosome pairs in *Paeonia californica*. Amer. Jour. Bot. 39: 145-151.

NOTES ON *COLLINSIA VIOLACEA*.—The designation of *Collinsia violacea* Nutt. as a spring annual, in spite of its very early flowering habit, has seemed worthy of observation to the writer. Both *C. violacea* Nutt. and *C. verna* Nutt. are found in Illinois, and the former has been collected only in Shelby County in the central part of the state where it has been reported for 20 years. The latter species is a rather common early spring flowering plant in widely separated moist woodlands throughout Illinois.

Flowering records for *Collinsia violacea* in this state indicate that it is in bloom from late April through May. In his *Scrophulariaceae of Eastern Temperate North America*, Francis W. Pennell says, "Our species are spring-annuals of deciduous forests, dying when the trees have reached full foliage." (Page 290). In

April 1955 the writer, with Dr. G. D. Fuller of Chicago, transplanted some Shelby County seedlings of *C. violacea*, then in bud, to a garden in Springfield, Sangamon County, Illinois. These "garden" plants thrived, flowered and produced seed. During November of the same year it was observed that *Collinsia* seedlings had appeared in abundance. Such observation later prompted a visit to the Shelby County locality, and on March 6, 1956, vigorous seedlings of *C. violacea* were seen. Thus it appears that "spring-annual" is not a good designation for this species, and use of "winter annual" is suggested as a better description. No data have been personally collected for *C. verna*, but Mr. Harry E. Ahles of the Botany Department, University of North Carolina, reports (in correspondence) that he observed seedlings of *C. verna* in Brownfield Woods, Champaign County, Illinois, behaving in the same manner as that described for *C. violacea*. *Collinsia violacea* propagates easily from seed and probably will thrive in suitable habitats in many localities.—GLEN S. WINTERINGER, ILLINOIS STATE MUSEUM, SPRINGFIELD, ILLINOIS.

TIARELLA CORDIFOLIA IN WISCONSIN.—False miterwort or foamflower (*Tiarella cordifolia* L.) has not previously been reported for Wisconsin. The late Dr. N. C. Fassett in the preliminary report on the Saxifragaceae (1932) referred to the range of this species as reported in Gray's Manual, edition seven, as west to Minnesota and indicated that it should be sought in Wisconsin.

Two specimens are contained in the University of Wisconsin Herbarium: *G. S. Cornwall*, Wis. (?), not dated and *C. Goessl*, Wisc., June 7, 1922. The poor data present and the fact that Fassett omitted any reference to these sheets is sufficient to suggest that they did not constitute a satisfactory first record. There is the possibility that they were not native collections.

The writer, while examining specimens in the Plant Ecology Collections, encountered a fine specimen, collected in flower by Messrs. *G. Cottam*, *R. T. Brown*, and *R. P. McIntosh*.

The plant was collected June 20, 1950, in a hemlock-hardwood stand in Florence County (T39N, R17E, S8). The stand was composed mainly of sugar maple, hemlock, basswood, yellow

birch and hornbeam with a scattering of balsam fir and slippery elm. Dominant understory associates were *Aralia nudicaulis*, *Aster macrophyllus*, *Erythronium americanum*, *Galium triflorum*, *Mitella nuda*, *Maianthemum canadense*, *Streptopus roseus* and *Trientalis borealis*.

The genus *Tiarella* in North America, has been monographed by Lakela (1937) and the specimen in question conforms most closely to the description of *Tiarella cordifolia*, typical variety. Manistee, Southern Michigan was apparently the most northwestern point of collection for the species known to Lakela.

This report provides an authentic first record for this species in Wisconsin and an extension of approximately 200 miles in a northwesterly direction of the range as cited in Lakela (1937). The specimen is deposited in the University of Wisconsin Herbarium.—PAUL F. MAYCOCK, DEPT. OF BOTANY, UNIVERSITY OF WISCONSIN.

LITERATURE CITED

- FASSETT, N. C. Preliminary reports of the flora of Wisconsin, XIX, Saxifragaceae. Trans. Wisc. Acad. Sc. 1932.
LAKELA, O. A monograph of the Genus *Tiarella* L. in North America. Amer. Jour. Bot. 24: 344-351. 1937.
ROBINSON, B. L., AND M. L. FERNALD. Gray's New Manual of Botany, 7th edit. Amer. Bk. Co., 926 pp. 1908.

MEDICAGO POLYMORPHA VAR. VULGARIS.—There is nothing like intense concentration on an intricate and perplexing problem to blind one to the very obvious. *Medicago polymorpha* L. var. *ciliaris* L., 1753, of course makes illegitimate my new combination based on *M. denticulata* var. *ciliaris* Ser. (Rhodora 58: 9). Our commonest bur clover, so-called *M. hispida*, must be *M. polymorpha* var. **vulgaris** (Benth.) comb. nov., based on *M. denticulata* var. *vulgaris* Benth., Cat. Pl. Ind. Pyr. p. 103, 1826. Under this go f. **apiculata** (Willd.) comb. nov., based on *M. apiculata* Willd., Sp. Pl. 3: 1414, 1802; and f. **tuberculata** (Godron) comb. nov., based on *M. polycarpa* var. *tuberculata* Godr. in Gren. & Godr., Fl. France 1: 390, 1848.—LLOYD H. SHINNERS.

Volume 58, no. 693, including pages 243-274, was issued 26 September, 1956

RATES FOR SPECIAL NUMBERS OF RHODORA

Many of the single numbers can be supplied only at special prices, as follows:

Vol. 12, no. 134: 50c	Vol. 37, no. 444: 55c	Vol. 47, no. 557: 75c
no. 138: 45c	Vol. 38, no. 445: 50c	no. 558: 50c
Vol. 13, no. 151: 70c	no. 448: 70c	no. 559: 75c
Vol. 14, no. 163: 60c	no. 450: 70c	no. 560: 60c
Vol. 15, no. 171: 45c	no. 455: 55c	no. 562: 85c
Vol. 16, no. 182: 45c	no. 456: 50c	no. 563: 85c
Vol. 17, no. 193: 45c	Vol. 39, no. 458: 50c	Vol. 48, no. 566: 60c
Vol. 18, no. 205: 50c	no. 463: 55c	no. 567: 50c
Vol. 19, no. 224: 45c	no. 464: 75c	no. 568: 60c
no. 225: 50c	no. 466: 55c	no. 569: 50c
Vol. 21, no. 241: 45c	Vol. 40, no. 471: \$1	no. 570: 50c
no. 243: 45c	no. 476: 50c	no. 571: 60c
Vol. 23, no. 265: 45c	no. 477: 55c	no. 572: 50c
no. 268: 45c	no. 478: 60c	no. 573: 70c
no. 269: 45c	no. 479: 55c	no. 574: 70c
no. 270: 45c	Vol. 41, no. 482: 55c	no. 575: 70c
no. 271: 45c	no. 486: 55c	no. 576: 50c
no. 274: 45c	no. 487: \$1	Vol. 49, no. 577: 50c
no. 275: 45c	no. 488: 60c	no. 578: 60c
Vol. 24, no. 279: 45c	no. 489: 95c	no. 580: 60c
no. 283: 45c	no. 490: 50c	no. 581: 70c
Vol. 25, no. 296: 45c	no. 491: 50c	no. 582: 80c
Vol. 26, no. 304: 50c	Vol. 42, no. 499: 50c	no. 583: 75c
no. 305: 60c	no. 500: \$1	no. 587: 50c
no. 306: 45c	no. 502: 50c	no. 588: 50c
Vol. 28, no. 331: 45c	no. 503: 70c	Vol. 50, no. 589: 45c
Vol. 29, no. 346: 45c	Vol. 43, no. 506: \$1	no. 590: 60c
Vol. 30, no. 351: 50c	no. 509: \$1	no. 591: 40c
no. 356: 45c	no. 512: 50c	no. 592: 60c
no. 357: 45c	no. 513: 50c	no. 593: 60c
Vol. 31, no. 364: 50c	no. 514: 70c	no. 594: 40c
no. 369: 50c	no. 515: 75c	no. 595: 75c
no. 370: 50c	Vol. 44, no. 520: 70c	no. 596: 85c
Vol. 32, no. 374: \$1	no. 525: 75c	no. 597: 55c
no. 376: 45c	no. 526: 75c	no. 598: 40c
no. 382: 50c	no. 527: 70c	no. 599: 60c
no. 383: 45c	no. 528: 60c	no. 600: 65c
Vol. 33, no. 386: 60c	Vol. 45, no. 529: \$1	Vol. 51, no. 603: 80c
no. 388: 45c	no. 531: 60c	no. 604: 85c
no. 389: 45c	no. 532: 55c	no. 609: 75c
no. 391: \$1	no. 533: 55c	no. 610: 70c
Vol. 34, no. 403: 45c	no. 534: 75c	no. 611: 70c
no. 407: 45c	no. 535: 70c	no. 612: 70c
Vol. 35, no. 410: 50c	no. 538: 85c	Vol. 52, no. 616: 50c
no. 418: 50c	no. 539: 75c	no. 617: 70c
no. 419: 50c	no. 540: 75c	no. 618: 60c
Vol. 36, no. 425: 55c	Vol. 46, no. 542: 50c	no. 623: 50c
no. 426: 50c	no. 544: 60c	no. 624: 60c
no. 429: 70c	no. 545: 55c	Vol. 53, no. 625: 60c
no. 430: 55c	no. 546: 55c	no. 626: 60c
Vol. 37, no. 433: \$1	no. 547: 50c	no. 627: 50c
no. 435: 60c	no. 548: 45c	no. 630: 50c
no. 436: 70c	no. 550: 55c	no. 635: 50c
no. 437: 50c	no. 551: 55c	no. 636: 60c
no. 439: 60c	no. 552: 50c	Vol. 54, no. 637: 50c
no. 440: 60c	Vol. 47, no. 553: 75c	no. 638: 50c
no. 441: 50c	no. 554: 50c	no. 639: 50c
no. 443: 55c	no. 555: 60c	no. 640: 65c
	no. 556: 75c	no. 647: 60c
		no. 648: 50c

DUPLICATE BOOKS FOR SALE

These books have Library book plates and are used copies, some worn, some in need of binding.

ALLIONI, C. *Flora Pedemontana . . . Augustae Taurinorum*, 1785. 3 volumes in 2. 92 plates. folio. \$50.00

Hedwig, J. *Descriptio et adumbratio microscopico-analytica muscorum . . . Lipsiae*, 1787-1797. col. pl. folio. 45.00

Hultén, Eric. *Flora of Alaska and Yukon*. 1941-50. 50.00

Loudon, J. C. *Arboretum et Fruticetum Britannicum*. 2nd ed. 8 vols. London, 1854. 20.00

Plumier, Charles. *Plantarum Americanum . . . Amstelædami*, 1755-60. fasc. 1-10. 262 plates. folio. 100.00

SARGENT, CHARLES SPRAGUE. *The Silva of North America*. Boston, 1891-1902. 14 volumes. This original edition is a used library copy and some volumes need re-binding. 85.00

Sowerby, James. *English botany*. London, 1790-1814. Volumes 1-36 (bound in 18 volumes). 50.00

•

ADDRESS THE LIBRARIAN

GRAY HERBARIUM OF HARVARD UNIVERSITY
22 Divinity Avenue, Cambridge 38, Mass.